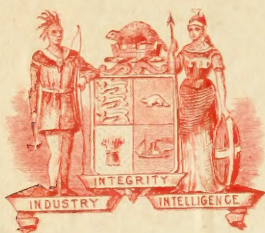


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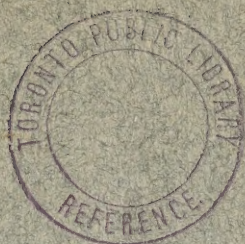
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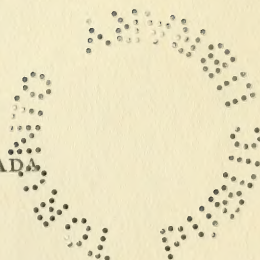
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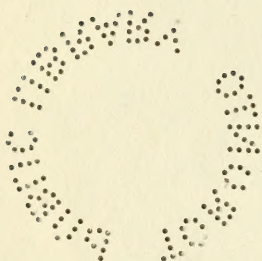
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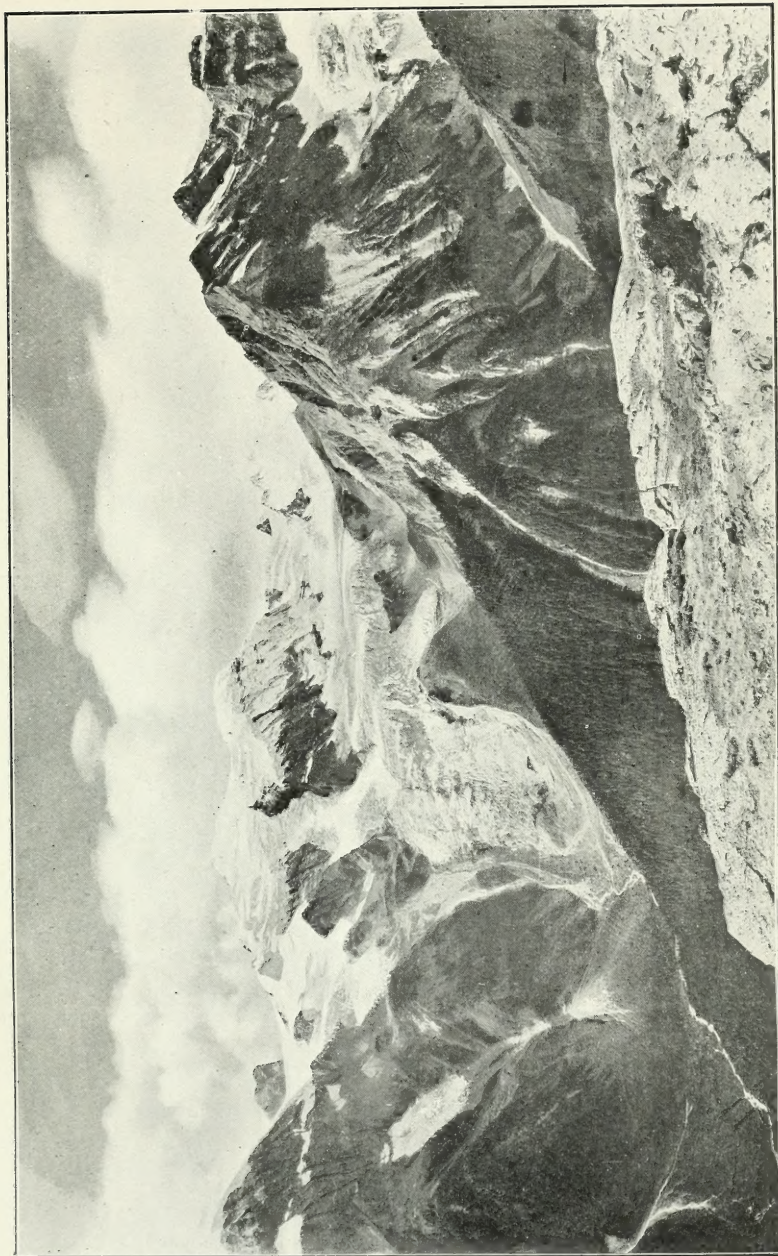


Photo A. O. Wheeler

MT. MUMMERY FROM BAKER PASS.

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CANADIAN ALPINE JOURNAL

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MOUNTAINEERING SECTION.

AN EXPEDITION TO THE FRESHFIELD GROUP.

BY J. E. C. EATON.

It was at the suggestion of my trusty guide Heinrich Burgener, that I decided to make an expedition to the Canadian Rockies in 1910. My ignorance of the Rockies and of the conditions and requisites for travelling therein was complete, but the kindness and hospitality which had been shown to members of the Alpine Club (London) by the Alpine Club of Canada encouraged me to apply for information, and not only was this furnished to me in a most practical and useful form, but Mr. Wheeler's letters conveyed an assurance of a most cordial welcome at Banff and a kind invitation to the annual camp. This latter I was unfortunately unable to accept, as I wished to reach some moderately remote group.

My party consisted of an Italian cousin of mine, Heinrich Burgener, and myself. Dr. Collie, who crossed the Atlantic on the same ship, suggested the Freshfield Group to me as one that was comparatively accessible, and yet rich in unclimbed peaks, and most kindly gave me his map of that and other groups lying to the north of Field.

On our arrival at Banff, where we met Mr. Mitchell, we made our way up to the Club House by a lovely path through the woods, and were delighted with the beauty of the situation, while nothing could exceed the kindness with which we were received. In fact, I must say that throughout this journey everyone was most good to us, and I am only too anxious to return to Canada again.

We now definitely decided on the Freshfield Group, and our first stage was to Lake Louise, whence on the same afternoon we caught a train which took us to Field in time for dinner. An interview with John Otto followed, with whom I had already been in correspondence, and it was arranged that we should start from Field on Friday, July 15th. Our outfit from England, about the bulk of which I had had some misgivings, was pronounced by Otto to be reasonable, to my great relief. Thursday the 14th we spent lazily in the morning and busily in the afternoon, unpacking and arranging the outfit. On this day we met Bruce Otto, John's brother, who was to accompany us as packer, and I do not think the British Empire contains a better fellow. Our party was probably the most varied in nationality that has ever gone out in the Rockies, consisting as it did of an Italian, a Swiss, an American (the cook), a Canadian and an Englishman. The two former had little or no English, while the next two had nothing but English, so that the interpreter's office was no sinecure.

On the 15th the weather was fairly good and we started at 10.40 a.m., the party consisting of Heinrich,

my cousin, Bruce Otto, myself and ten ponies. After crossing the Kicking Horse River by the bridge and riding for a couple of miles along a good road (which leads, I believe, to Emerald Lake) we turned to the left into the forest, on a trail. We soon came to a steeper path than I had ever ridden down before, but cayuses seem to be differently built from other horses, and ours negotiated the steep bit beautifully. The saddles also were admirably adapted for their purpose. We now crossed Emerald Creek, and soon came to a place where we decided to camp, although it was only about four miles out, so that Bruce might return to Field and get some fishing tackle and other things which had been forgotten. We spent a peaceful afternoon after pitching the tent and lunching, while a slight shower led us to dig a trench round the tent with our axes. After supper, we heard with much pleasure and, of course, the requisite amount of credulity, a story of a man who fell into an ice stream, and was so numbed that he had to chew the reins through, in order to get free.

On the 16th of July, after breakfasting sumptuously, we started at 9.10 in a N. W. direction, through the forest. Crossing a creek by a bridge, we next walked up a steep path, and then going alternately up and down hill, we entered the valley of the North Fork (v. Collie's map). Camp was pitched near some burnt timber, on the right bank of the stream. We were pretty stiff after a seven hours ride, and some members of the party promptly withdrew with some grease. A little fishing was attended with fair success, but the tortures inflicted by the mosquitoes were indescribable. The creek rose somewhat in the evening, owing to a storm to the north of us. A little rain fell in the night.

On the 17th we got under weigh about noon. The trail was very rough to-day. After crossing the river several times, we reached Baker's Pass at about 3 p.m. and camped about 200 feet below it on the north side.

July the 18th was a lovely day. We started at 10.40 and rose to a height of about 7400 ft. because bluffs prevent progress in the valley, and from here we had a beautiful view of Mt. Mummery, some of the Freshfield Group and Mt. Sir Sandford. The trail now dropped very steeply for about 3,000 ft., but we had no trouble until we came to the Trapper's Creek, which was the worst we had to cross on the whole expedition. The bottom was very bad, and the current was swift and quite sufficiently deep. However, Bruce on Snowball, his excellent pony, led across, and the rest of the outfit followed without mishap. A further descent now brought us into the Blaeberry Valley, and, passing a trapper's cabin, we ascended the left bank of the Blaeberry River for some distance, and then crossed it to camp. The water was deeper than in the Trapper's Creek, but the bottom was good. We camped this night right on the trail, and slept very comfortably, thanks to some pine branches. There was a fine view of the Pyramid from the camp, and the view down the valley, with moonlight on the water, was very beautiful.

On the 19th we started at about 10 a.m. up the valley, the woods in which were particularly lovely. We reached camp on the Howse Pass at 2.30 p.m. Bruce was always anxious to consult our convenience about the selection of a camping place, but of course I fell in with his views, although the day's marches seemed rather short to us. The ponies, if consulted, would have no doubt expressed a contrary opinion. We enjoyed from the Howse Pass a beautiful view of Mt. Forbes, which peak we subsequently found as the barometer of the district. It was here that I made the horrible discovery that the stock of tobacco was getting very low. The weather, however, was lovely, and the sky of quite an Italian blue.

On the 20th we set out at 9 a.m. in splendid weather and rode down the river through a canon. Behind us



Photo J. E. C. Eaton

MT. MUMMERY FROM BAKER PASS



Photo J. E. C. Eaton

MT. FORBES FROM CAMP ON SASKATCHEWAN RIVER

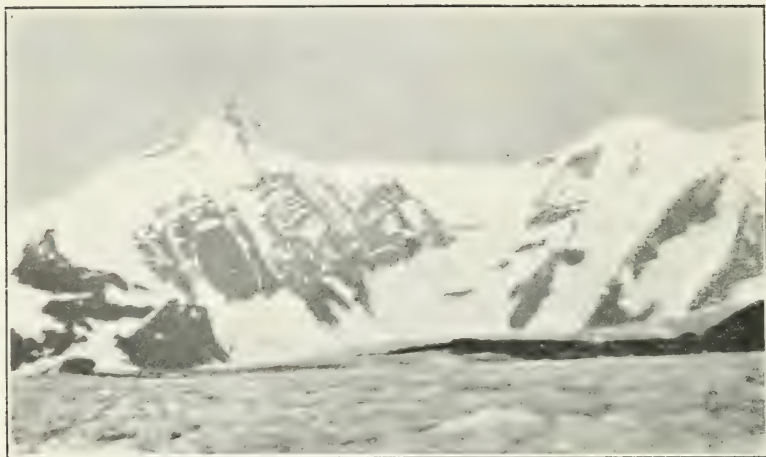


Photo J. E. C. Eaton

MT. FRESHFIELD AND SNOW DOME BETWEEN FRESHFIELD AND DENT.



Photo J. E. C. Eaton

MT. DENT AND SNOW DOME BETWEEN DENT AND FRESHFIELD.

was a fine view of Mt. Collie. In an hour or two we reached the shingle flats of the Saskatchewan River and were in some doubt as to whether the turning to the left was the one that led to the Freshfield Glacier, as on Collie's map there are three glaciers marked, and we only remembered passing one. We at length pitched our camp on the right bank of the stream issuing from what proved to be the Freshfield Glacier. Meanwhile, however, Bruce and I rode some distance down the valley to see whether there was another glacier. Finding none, we were satisfied that the Freshfield Glacier was the one from which our stream issued.

At 9.45 on the 21st, the whole party except Glen Jordan started off to explore. We made our way through the forest, on the right bank of the river, being somewhat assisted by bear trails. We presently came to some pestilent scrub, through which we forced our way. After about two hours tribulation, we emerged, and saw the glacier before us. We ascended it about halfway and found it so far very free from crevasses. Mt. Freshfield stood right in front of us, Mt. Dent to the right, and Pilkington, Walker and a nameless peak to the left. We returned to camp, keeping down by the river, instead of going up the hillside as before. Bruce expressed himself as willing to climb with us, but seemed doubtful about leaving the horses. The air in the evening was very smoky, and, as often happened, this smokiness of the atmosphere was followed by rain in the night.

The 22nd was wet at intervals all day, but the tent was fortunately watertight. Our appetites were good, and one felt one was getting fat and lazy, so Heinrich and I went for a walk in the afternoon. The weather was better in the evening, and cooler, and the mosquitoes were not quite so bad as usual.

The weather on the 23rd was more promising, but not sufficiently so to allow us to go to the proposed

bivouac by the glacier. N. M. and I strolled up to the canon, and saw Bruce cutting the trail for—as we hoped—the following day. The afternoon seemed long and weary, with alternate sunshine and rain, much cloud, and persistent mosquitoes.

On the following day, the 24th, the fates were once more against us, so we went fishing, morning and afternoon. The top of Mt. Forbes was quite invisible during the bad weather.

The 25th gave promise of an improvement, but we decided to wait another day. Heinrich and I, however, took a walk up the glacier, and returned to camp at 5 p.m. We thought we had discovered two practicable routes up Mt. Dent, and the scrub was found excellent as a corrective to our recent lazy and Gargantuan existence. The top of Mt. Forbes was almost clear this evening, but the weather was warm, and did not improve as the evening wore on. The next day was ushered in by rain and thunder, but later the weather improved, although the wind was always the same (W. to S.W.). The end of our tobacco was now in sight, and this, combined with the capriciousness of the elements, made the outlook the reverse of cheerful. However, in the evening the weather improved.

The 27th was fine, so we loaded up two ponies (Niche and Kootenay), and started for the glacier at 10.10 a.m. Three hour's work brought us to the snout of the glacier. I had been hoping to bivouac some way up the glacier on its left bank, but Bruce considered it impossible to take the ponies onto the ice, so we resigned ourselves to camping at the snout. I had set the barometer at the lower camp to 4650 ft. and at the snout of the glacier it marked 4900 ft. The wind was roughly N.W. After lunch Bruce and Glen took the horses back to the lower camp and Bruce returned to us in time to cook our dinner, which he did with some skill.



Photo J. E. C. Eaton

MT. PILKINGTON (on right): MT. WALKER (on left) and NAMELESS PEAK (in centre)



Photo J. E. C. Eaton

PYRAMID PEAK FROM CAMP ON SASKATCHEWAN RIVER

On the 28th we started at 3.03 a.m. to attempt the ascents of Mts. Pilkington and Walker. We now felt that we were drawing near to the accomplishment of our real purpose in Canada, namely: The conquest of some unclimbed peaks. It still remained to be seen, however, whether Fortune would smile upon us, or not. We made good progress up the glacier, and after working our way through the region of crevasses, of which there are plenty just where the glacier issues from the Freshfield Icefield, we had some discussion as to the route we should follow in our attack on Pilkington. I, from advice previously received from a member of the party which had preceded us in this group, was inclined to go straight up the ice field to the col between Pilkington and Walker, and to attack both peaks from that col. Heinrich, on the other hand, wished to give battle to Pilkington from the N. E. and to traverse the mountain from its N. E. extremity to the aforesaid col. His view prevailed, as usual, and, as it happened, his route afforded us a much finer, and somewhat more difficult climb than mine would have been, besides enabling us to traverse Pilkington, and ascend Walker and another nameless peak—of which more anon—in one day.

We crossed the icefield obliquely in a S. W. direction, and on reaching the base of Mt. Pilkington, began to ascend a steep snow slope which faced N. E. Though the snow slope was steep the snow was excellent, and we rose rapidly, crossing a small bergschrund without much trouble. We breakfasted on a small patch of loose rocks, and afterwards resumed the ascent of the snow wall to the N. ridge. This consisted of easy rock and snow, but the rock was very loose. On reaching the first summit at 8.45 a.m. we saw that the other was considerably higher, and dropped down to the snow col between the two, meeting with no difficulty, except for a slabby traverse. From the col onwards we had some good climb-

ing. Two slabby gendarmes had to be negotiated, one of them being somewhat iced. A steep but easy chimney gave us access to the top of the first gendarme, while the other was overcome by means of a Chamonix letterbox, and we reached the real summit of the peak without further difficulty at 9.18 a.m. The aneroid gave a height of 10,200 ft.

At one time we were very seriously alarmed about the weather, for the blackest curtain of cloud I have ever seen in the mountains was coming up from the west, and it actually began to snow. Very soon, however, the storm cleared away, leaving perfect weather. In this respect I think the elements are much kinder in the Rockies than in the Alps, for I have never seen such threatening weather clear away in the Alps.

We descended to the snowfield between Pilkington and Walker by the easy snow of the S. ridge, and sent Bruce across to the foot of Mt. Walker with the sacks, while Heinrich and I ascended an easy peak somewhat to the S. of Walker, reaching its summit at 11 a.m. This peak, which I believe to be nameless, is connected by a long *arête* with Mt. Mummery, and I should be very glad if, in view of this fact, in conjunction with that of Heinrich Burgener's guiding the first party to ascend the peak, it could be called Mt. Burgener. Its height, according to my aneroid as 10,250 ft. We descended this peak by the same route as that of our ascent, which consisted of an easy snow *arête* interspersed with rock, crossed the snowfield and rejoined Bruce. Having tied him on, we all three ascended Walker without difficulty by its S. ridge, consisting of slabs, scree and a little snow. The summit was reached at noon. The height, according to the aneroid was 10,200 ft.

The traverse of Mt. Pilkington was by far the most interesting climb of the three. The descent from the Pilkington-Walker snowfield gave us much less trouble than

we had anticipated, for the route had appeared much crevassed from above. The tramp down to camp, however, was long and weary, with much jumping of crevasses, and I for one was very glad to arrive at 4.08 p.m. Bruce, though fatigued, made us some tea, and soon busied himself with the preparations for supper. The weather was fine, but the wind was not in a good quarter this evening.

The 29th was a day of rest and most welcome. In the afternoon we had a visit from N. M. and Glen, who had taken five hours to come up from the lower camp, Glen having blazed the trail. After they left us, a storm approached from the S. W. and soon broke, lasting till 7 p.m. when we emerged from our tents and supped. We retired at 9 p.m., the sky being clear so that our hopes for the morrow were high.

On the 30th we started at 3.37 a.m., which was rather later than we had intended, but we marched rapidly up the glacier towards Mt. Dent. Heinrich examined the mountain with the glasses and came to the conclusion that the middle *arête* was the best, because, though mine—the northernmost one—was the easier, there was a step at the top, about the practicability of which he was in doubt. The southernmost *arête* of the three was open to the objection of being somewhat exposed to ice avalanches, besides the fact that on leaving it, one would be on a slope of dangerous snow.

We ascended a snow slope and then took to the rocks, which were very easy at first, so that we travelled for some distance unroped. Later on the climbing became more difficult, and we put on the rope. The rocks were now exceedingly loose, so much so that we considered them to be the rottenest we had ever climbed, not excepting those of the Teufelsgrat, and the climbing was far from easy for a time. Bruce went slowly but safely, while Heinrich led with his usual judgment and

skill. In due course we reached the top of the rock ridge, one great advantage of which is that it lands one on the snowfield at a considerably higher level than the *arêtes* to the north and south. We here realized, however, that the step on the *arête* to the north, which I have mentioned above, was practicable.

Above the *arête* we ascended a steep snow slope, which might conceivably be somewhat dangerous if the snow were bad, and made our way obliquely up the snowfield bearing somewhat to the left. A bergschrund a little further on gave us no trouble and we soon reached the col below the peak of Dent. Here Bruce explained that he preferred to wait for us while we completed the ascent. We thought we could see the top from this point and than ten minutes walk up a kind of scree would take us there, so we left the rope and axes with Bruce. We soon repented of our folly for the summit was much further than it had appeared to be and rose in a snow peak above and to the left of the point we had seen. However, we made our way up and then traversed to the left reaching the summit without mishap, but finding it necessary to exercise some care. We left no names and made no stoneman on the top for we forgot to do so, and, the weather being very threatening we did not care to return to the summit to repair the omission when it occurred to us. The aneroid marked 10,100 ft. on the summit, and it was 10.16 a.m. when we arrived there.

Descending by an *arête* running down roughly S.W., we next glissaded down a couloir onto the snowfield to the south of Dent. Both Heinrich and I now fell into a hole but fortunately only one leg went through in each case. Bruce having rejoined us we put on the rope and traversed the nameless dome which stands between Dent and Freshfield. After this, we marched rapidly along the ridge, which is really a succession of broad snow hillocks, and presents no difficulty. In places there

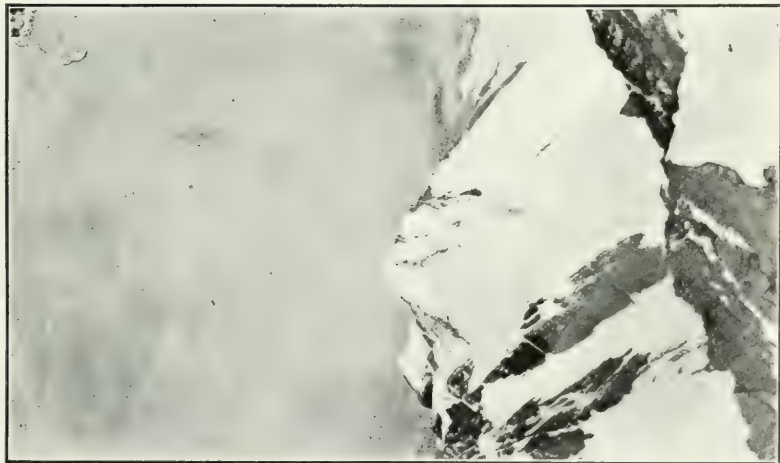


Photo J. E. C. Eaton
SOUTH FACE OF MT. FRESHFIELD



Photo Lieut. Marasco
EATON AND HIS SWISS GUIDE
HEINRICH BURGNER
on summit of Mt. Freshfield

were patches of scree, and in one hollow a little glacier lake. By noon we were at the foot of the west *arête* of Freshfield by which we proposed to ascend this peak.

The ascent took us fifty minutes and though it afforded some climbing it was easier, and the rocks were much better than on Dent. On leaving the summit to descend the mountain on its south and south-east sides we crossed a steep snow slope, starting a tiny avalanche and then took to a scree ridge. We soon came to snow again, however, and were able to shoot crevasses sitting, descending to the glacier without difficulty. Here we had some trouble with crevasses which did not end till we reached the lower level of the glacier, and joined our Pilkington route. Heinrich found the way through the crevasses very well.

The walk down the glacier was a weary one and I was glad when we reached our camp at 5 p.m. Nevertheless, however weary one might be in body, one was joyful in spirit, for we had experienced two most successful days climbing during which we had ascended five peaks, four of which were we believed, virgin. I decided to stop the night where I was instead of descending to the lower camp, but Bruce preferred to descend and look to his horses.

In my description of the climbs I have omitted any allusion to the views obtained from the summits. The peculiarity which strikes one most of all is the vastness of the region. In most parts of the Alps on one side or the other, you generally see the plains, whereas in the Canadian Rockies one sees an ocean of peaks on all sides. As our peaks were almost in a line and fairly close together the main characteristics of the different views we obtained from the summits were not dissimilar. Mt. Lyell and its icefield were striking features to the north, while immediately to the west was a huge and, I believe,

unexplored snowfield, and beyond that the Bush River Valley descending to the Columbia Valley. Mt. Sir Sandford was a conspicuous object to the west, as also was Mt. Forbes to the north or north-east.

On the 31st, Heinrich and I descended in a leisurely manner to the lower camp, leaving the camp things to be fetched by Bruce and Glen with the horses. On the following day, August the 1st, the whole party started down the Saskatchewan river and camped opposite the Glacier Lake (v. Collie's map).

On August the 2nd we crossed Bear Creek which—to my surprise—gave us no trouble, for I had been warned against it. We camped this evening close under the Howse Peak in the Bear Creek Valley. The mosquitoes now began to be much less troublesome, and gradually disappeared henceforth. The next day we hoped to make Bow Pass, but failed to do so. On the 4th we reached it in about two hours from camp and lunched at Upper Bow Lake, which was exceedingly beautiful. Near this lake we saw eleven horses feeding, but no signs of the party to which they belonged. Camp on the left bank of the Bow river was reached at 3.10 p.m. and there was only just time to pitch the tent before a fearful storm broke over us. The sky cleared in the evening but clouded over again at 2 a.m.

On August the 5th we purposed to start at 8 a.m. in order to make Laggan comfortably that day, but did not get off before 10.30. We rode practically all day in the rain and reached Laggan in a thoroughly sodden condition at 7 p.m. Camp was pitched in a field beyond the station, and the rain having ceased, we were able to don dry clothes. After supper Heinrich, N. M. and I repaired to the station, and, luxury of luxuries, were able to buy some tobacco and cigars. Bruce had for the last week been good naturedly supplying me with some black chewing tobacco, which I had found very satisfying in a

pipe. Our train came in punctually, and our appearance seemed to surprise some of the passengers.

We travelled to Field having asked the indulgence of the conductor in the matter of our fares, which we paid at Field. So ended our delightful and not unsuccessful expedition in the Rockies, and it is sad that its close was clouded by the news of the fatal accident to Alexander Burgener and his son in the Bernese Oberland in July. It seemed to me best to take Heinrich home as soon as possible and we just managed to catch the "Empress of Ireland" on August the 12th.

The better photographs were taken by my cousin, Lieut. Marocco, and the worst ones by the writer.

FIRST ASCENT OF MT. HAMMOND.

BY CHARLES D. ELLIS.

The mountaineer seeking an example of highest conjugal perfection might turn back twenty-five hundred years to the days of Nebuchadnezzar, King of Assyria, who, to please his queen and save her from pining for her beautiful Median hills, constructed the famous hanging gardens of Babylon. In this day and age we cannot have representations of mountains brought into the plains; but those who are not fortunate enough to live near them can, with our rapid transit, renew their love, now and again, by a holiday spent in their midst. People of the prairies are not so loyal to their sky-bound areas as the sailors of the sea and the men of the mountains are to their respective habitat. How rarely we see a sailor far from the sea, or a Swiss located far from the mountains! Each year our mountains add more devotees to their shrine, and a few weeks spent in their environment furnish pleasant thoughts for a whole year, as well as renew life and strength.

As this is the record of an eventful holiday in the mountains the sooner the first person singularly steps onto the stage and brings his friends along, the sooner the story is told. Having the good fortune to be born in the Rockies and springing from a race whose prince is always heir to the British Crown, my love for the mountains and sympathy with Queen Amytis can be easily understood. Twelve years I have spent in the Upper Columbia valley, in that portion of the Selkirk range which is included in the Windermere district, and in that time have come to know the country as few others.

Prospecting and pleasure trips have taken me over all the roads and trails until they are as familiar as the paths over the ranch.

During the two years that Mr. Herbert W. Gleason, of Boston, had visited the valley I had the pleasure of joining him on several short excursions. When, last August, he was able to visit us for a third time, we concluded to take an outing that would give us some exploring. Mr. E. W. Harnden, also of Boston, an enthusiastic out-of-doors man, who had been with Mr. Gleason on many of his vacations, made the third of our party.

Mount Hammond and the vicinity were chosen as the objective of this excursion. We obtained permission to use the buildings of a mining company in Paradise Basin as our Camp. The distance from Windermere is about twenty miles by a first-class waggon road; and, taking the elevation of Windermere lake as 2563 feet, and the Camp at Paradise as 7843 feet, the difference is just a mile in altitude. Smoke delayed us for some days; then, on the 30th August, a good rain cleared the sky, and we prepared to start for the mountains. The morning of the 31st dawned wet and foggy. Disappointed but undaunted, we waited. At noon the sun shone brightly and we made a start by a livery team that proved to have been out to a dance the night before, or rather had taken a load of dancers, and was in no condition to fulfill the contract it had undertaken. However, supper-time found us at Jack Pine, sixteen miles from Windermere. "Old Pete" and several others we knew were encamped here, and invited us to share their meal which we did heartily. We were now at the parting of the ways; the Spring Creek road that leads up to Paradise Mine leaves the main Toby Creek road at this point. Only eight miles left to finish our journey, and still several hours of daylight; we concluded to go on. We had proceeded but a mile or so when we discovered our mistake. The poor horses were com-

pletely fagged. Not willing to turn back, we agreed to walk, leaving the man to bring the outfit along slowly. Darkness overtook us when we had done half the distance and with the night came a heavy shower. We played a game of pussy-wants-a-corner, trying to find trees with foliage thick enough to prevent the rain soaking us. The trees found here are so tall and willowy that their swaying tops invite every passing gust to scatter rain drops at their roots. We were soon as miserable as wet hens.

Mr. Gleason had secured a bunch of keys that were to let us into Paradise; not from "Old Pete" nor from St. Peter, but from the manager of the mine. As we gained a higher level, large, wet flakes of snow added to our discomfort. Convinced that the storm had set in for the night, we tramped on. Taking the keys I hurried ahead. Before we had been traveling through a black labyrinth; now the way was marked with snow and the forest like an impenetrable wall on either side. The dark, shadowy buildings proved I had arrived at my destination. It was fortunate that I knew just which door to unlock. With fingers cold and stiff I tried to fit one of the dozen keys into the padlock. After going over the whole bunch for the second time without finding the right one, the string with which they were tied broke, and—well, they scattered in about two inches of slush on the doorstep. The jig was up, so far as entrance by the door was concerned. I thought of the sliding kitchen windows. Passing round the house I tried one which, to my joy, slid back easily. In climbing over the sill my boot lace caught on a nail, threw me off my balance, and I fell some distance onto a table which overturned, bringing down a shower of pots and pans, and setting an army of mountain rats and gophers skurrying. I could see nothing; the noise and the feel of the wreck of which I was the centre made up for sight. Experience has taught me

that when one door is padlocked, if there is a second it is usually fastened from the inside with a bar; this, happily, proved the case. The rest of the party had now arrived, but too late to share the reception. The situation was explained in a moment and matches demanded—my own were reduced to useless sticks. Mr. Harnden produced some from a water-tight box, the only dry spot upon him. Candles lighted, a roaring fire was soon cheering things up. The horses cared for and the kettle boiling, we began to feel that it was good to be alive. Pea soup, made from specially prepared material flavored with celery bouillon, was followed by baked beans—not Boston. It is only fair to say that Mr. Gleason doesn't eat beans. Mr. Harnden, the driver, and I, did justice to them.

Mr. Gleason declares that I began snoring while unlacing my boots. This may account for my not having any knowledge of the reception committee which waited on my friends. Lights were no sooner out than the fun began; so I am informed. The moon, which had now come out, lighted the room dimly. The whole house is lined with building paper which hangs loosely from the ceiling and walls. Through rents in this the mountain rats trooped. I slept in a top bunk; Mr. Harnden in one beneath. Mr. Gleason, from a cot in the corner—and rather rat shy—saw them jump down on my bunk, using me for a mat, and then engage in a game of rugby. When they tired of this and started to reconnoitre, Mr. Gleason objected to their advances and began bombarding the upper bunk. A stray missile awoke Mr. Harnden, who, after fortifying himself, went to sleep again. This I am told kept up all night through. Daylight drove the enemy away. When I awoke and looked around, I felt that I had had an attack of somnambulic kleptomania; or had dreamed I was the proprietor of a pawn shop, dealing chiefly in boots, old clothes and pillows. Seeing

the gentlemen peacefully sleeping I restored their belongings and slipped quietly out and prepared breakfast. Unoccupied buildings in the mountains soon become infested with rodents. When the mine was closed some years before a quantity of supplies was left. This had been gnawed and strewn all over the house. The gophers now came in swarms. On the top of a table in an adjoining room we counted no less than eleven at one time, engaged in digging holes in an old sack of flour. One got caught in a can of cornmeal; he had entered through a dent in the lid, but greedily filled his pouches so full he was unable to escape. When liberated he retreated under the wood pile backward, dragging his head.

By noon the sun had taken the snow away enough to allow us to do a little climbing in the neighbourhood of the mine. We took the zig-zag trail that leads past the portal, where chunks of galena sparkled brightly in the sun; at another place bins of silver-grey carbonate lay waiting transportation to the smelter. Reaching the ridge to the north we followed it west, overlooking Paradise Basin and Boulder Creek. We were very much interested in our elevations as registered by our barometer, which was made by one of the most reliable Scotch firms. At the end of the ridge, which is also the divide at the head of Paradise Basin, our reading was 9,600 feet. From this point we could see south and west Clearwater Basin, and north and west, Boulder Creek. Directly ahead and between the two stood Mt. Hammond, majestic and supreme. A roof-shaped ridge that appeared to join directly on Hammond concealed the base, but by previous exploring I knew a deep abyss separated the two. Upon this ridge saw a cairn built, I am told, by Prof. Parker last year. The ridge is nearly if not quite 11,000 ft. high. The sun setting clear and promising a good day to-morrow, we returned to camp.

The plan was to make a start at 5 a.m.; but seven o'clock came before we were away. Mr. Gleason not feeling equal to a day of hardships and filled with uncertainties remained at camp. Frost silvered and softened the rough rocks and turned the fading leaves of the anemones into downy feathers. The gnarled larches scattered their golden needles in the frozen pools that the melting snow had formed in every hollow. We were soon out of these, as the camp is at the very edge of timber line. Walking was good over the crisp grass of the basin; and in exactly forty-five minutes we had reached the divide.

The geological strata of this basin present a wonderful example of the contortion the infant earth went through. In the exposed rock below the camp you find great beds of conglomerate lying in layers with schist. This formation is characteristic of the whole country east of the Paradise Mine, down into the valley itself, always, or nearly so, standing perpendicular. At the mine an extensive quartzite reef crops out. It is probable that the chemical properties of this reef in contact with the other formation resulted in the deposit of ore found here. At this reef the whole geological character of the Selkirks changes. The lime strata from here westward to the head of the basin had gone through the struggle spoken of, the whole floor being strewn with float, galena, iron and highly mineralized ledge matter. At the divide we found another reef of quartzite and considerable evidence of mineral. Prospectors had uncovered a great deal of oxidized iron and other mineral stains.

Looking eastward, the valley flooded with the morning sun and clear and fresh from its recent bath, we were able to distinguish large objects with the naked eye, though they were more than twenty miles away. The steamer Klahowya moved up the turquoise water of Windermere Lake like a great white bird. An eagle

soared lazily far above us. Here we laid our plans of attack. Straight before us forming a wall to the west of Clearwater Basin stretched the backbone of Mt. Hammond. This suggested a possible route. Accordingly, we set out, following the southern slope of the roof-like peak or ridge. The rock now changed to a regular solid formation of golden limestone, containing little if any signs of mineral, nor any fault nor fissure that might suggest the presence of any. We were far above vegetation, except for the hardy tufts of goat grass, moss or lichen.

Climbing the moraine of an extinct glacier we came face to face with two fine specimens of mazama or mountain goat (*Haplocerus montanus*); in fact so near that we could almost touch them with our ice picks. The surprise was so complete that we stood like a quartette of blushing school girls. When Mr. Harnden remembered that he had a camera they had turned the corner of the rocks. They were too far away for a good picture when we saw them again climbing the almost perpendicular rock face, sending down large rocks as they climbed. I believe this is one of their defences. I had watched them when they thought no one was near and they did not loosen any. Every time I have frightened them they send down a great many. Not in their haste, for they always move very deliberately. We were now at the head of Clearwater Basin where we found a small lake. So far as we knew the little gem had no name so we dubbed it "Alice" in honour of a certain Boston lady.* I officiated as high priest of the occasion. Filling the empty bean can with water, I notified the rocks and snows that henceforth and forever Lake Alice was the queen of Clearwater Basin; which, repeated three times, finished the ceremony. The goats, as if to include them-

* There is a Lake Alice on the West side of the Bow Valley.—Ed.

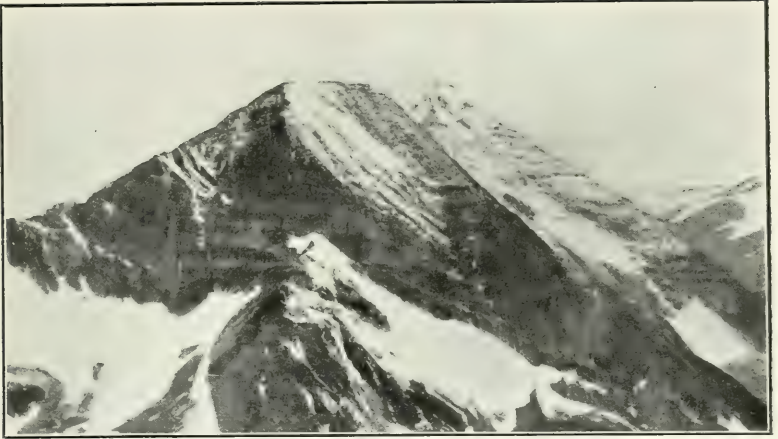


Photo E. W. Harnden

MT. HAMMOND AND THE ROOF RIDGE (Parker's Peak
on the Boulder Creek Side



Photo E. W. Harnden

LAKE ALICE AND THE ROCK RIDGE BY WHICH ELLIS AND HARNDEN CLIMBED

selves in the rite, sent a huge rock flying down, starting more in its descent; a dozen reached the lake and plunged into the water.

Although it was but half past nine we had lunch, consisting of beans, chocolate and raisins. The barometer read 8875 feet, showing a difference of 625 feet lower than the divide at Paradise Basin. We had come in two and a half hours four miles over a very trying country; almost too quickly, as we afterwards learned, for Mr. Harnden, who was only just trying to teach his office legs their old tricks of mountain climbing. The next two hours and a half we accomplished not more than 1250 feet; this for a short distance over a small slide, then up a rock face that at times only offered handholds. Reaching the top of this wall we found the other side as steep as the one we had just scaled. The wall continued south to a peak that overlooks Toby Creek and climbs north to the crown of Mt. Hammond which now exposed its south and south-west slopes. The basin into which we looked contained a small snow covered icefield which feeds a creek that flows south-west to the Little North Fork of Toby Creek, emptying into that stream near the Elysian Soda Springs. I am perfectly familiar with every creek and basin tributary to the North Fork. I had prospected the very basin into which we now looked twelve years before and even then planned to climb the mountain; but in those days locating mines was of more importance than climbing peaks. In the next basin west I had spent two winters and part of several summers trying to unlock the treasure chest of the hills. Now, only transportation is needed to bring the time and labor then spent to fruition. It is from this side that Hammond should be approached. The Elysian Springs are only eighteen miles from the Columbia river, over a smooth road. A trail leads up from them to an abandoned mine, whence the way is over the snow and rocks

to the summit; say a distance of five miles with no loss of time climbing divides.

Continuing our way, sometimes up difficult places, at one o'clock we had gained an elevation of 11,000 feet. Refreshing ourselves with a lunch, we studied the great peak that still towered above us. But few hours remained to do the mountain and return to camp. The crucial time had arrived. Mr. Harnden thought it almost too much to add more to an already strenuous day. Feeling confident that I could finish the climb alone, I told Mr. Harnden so. Now, it seems selfish, doesn't it, to be so near the goal and leave your companion and run on and take laurels? Mr. Harnden unselfishly consented to wait my return. While it would have been hard for me to curb my ambition and give up the climb, I would have done so. But, talking over the situation, three things decided the question. First, we knew that others had designed to secure the peak; for all we knew they were on the way now. Second, the season was grownig late; even now cirrus clouds were drifting in and combing themselves on the peaks of the south. Third, other peaks nearer the divide of the range offered virgin slopes to the climber. I felt a thrill when I heard him say: "Take Hammond if you can, I shall be content if we get one of those over there next summer," indicating with a sweep of his hand half a hundred peaks that studded the western horizon.

Leaving all impedimenta save a bottle for the record, I lost no time. The way was over loose, dry rocks that ran down in little avalanches when I crossed them. I passed over these swiftly, only resting when the solid rock cropped out. The course was a little west of north, rising rapidly. I never changed this until I found myself looking into the basin on the Boulder Creek side of the summit. The wall here drops down several thousand feet, cutting off all possible change of going round the crown.

The barometer read 12,000 ft. A perpendicular yellow rock seemed to indicate further climbing impossible. I followed it eastward to the first opening; this was filled with rocks and ice. The second fissure was dry and smooth, offering no handholds. A third filled with loose rocks gave me a chance. This I scrambled up, finding a heap of green iron stained shale that was piled loosely on the yellow rock that had so nearly baffled me.

At last I was on the top. How did I feel? Only pleasure, with one regret; that my companion had not been able to finish the climb. Overhead the great blue bowl of the sky bent over me. All around stood peaks and series of peaks with amethystine valleys between. To the north-west Mt. Farnham reared its cathedral spire; south-west Copper Crown at the source of Copper Creek (a south tributary to Toby Creek) glistened in the sun. The eight glaciers on the Little North Fork seemed near at hand. Further west the peaks and glaciers near Earl Grey Pass—an alpine country in itself. Eastward lay the fertile Columbia Valley and its lakes; and further east the sublime Rockies with their sentinels, Assiniboine, Goodsir, Stephen and Vaux, standing at attention.

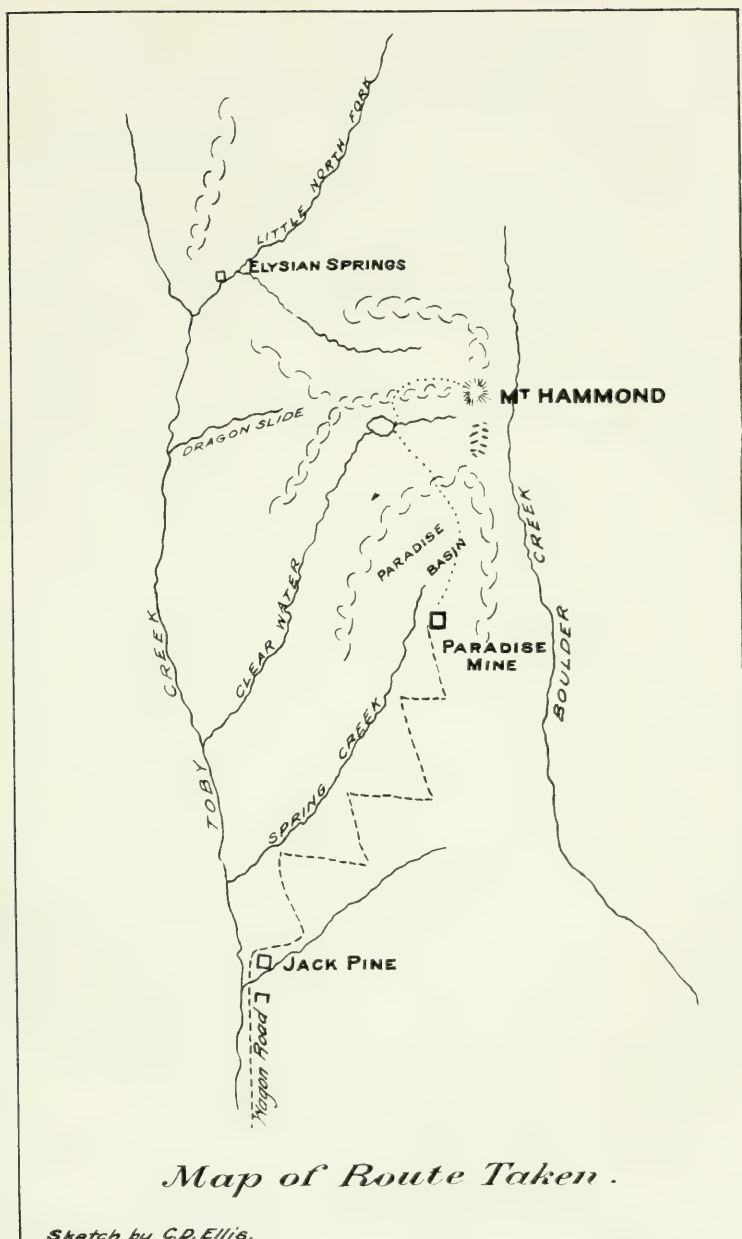
While I stood there, realizing that for the first time one of God's frail creatures was permitted to view his marvelous handiwork from this grand peak, these lines from the first chapter of Genesis came to me: "God saw everything that He had made, and behold it was very good." What we call going back to Nature is going back to God. The mad rush of the last few decades, seeking out all the land, building homes and founding cities, threading the valleys and hills with railways, and harnessing the mighty rivers, has drawn men away from the appreciation of the simple beauties of Nature. The possession of all our much lauded modern comforts does not seem to have satisfied. The soul is hungry. It is back to Nature, back to the simple life. Here in these

mountains, absolutely new, there is no better place to spent a few weeks or a month "far from the madding crowd."

The crown of Hammond is split into almost equal parts, the south half, upon which I stood, very little higher than the north. A chasm only ten feet wide separates them. The shale slabs which cover the summit are none so large but a man can lift them easily. From these I built a cairn, placing in it a flat flask containing a paper upon which is written: "Mt. Hammond, elevation 12,125 feet, September 2nd, 1910. Named in honor of the late Herbert Carlyle Hammond, of Toronto. Charles D. Ellis. Gloria in excelsis Deo." I saw this inscription written over the door of a great cathedral when I was a child. Since then I remember it when anything appeals to me as wonderful. Mr. Hammond was one of the first to become interested in the mines in this district, and financed the development of the Paradise Mine. He always admired the peak, so as a monument to his memory it was named for him.* The secret of the mountain's height seems to be a peculiar crystal-line blanket that covers the top and prevents erosion. On each side of the mountain, probably half way between base and summit, are two dykes of trachyte which, traversing the strata north and south, serve to hold the mountain together.

I found a cleft on the south side through which I descended easily and soon reached Mr. Harnden who had watched the climb and was very much pleased with my success. Refreshed by his long rest we at once started for camp, arriving at seven p.m., after twelve hours of steady going. Mr. Gleason had a good day with his

* It seems highly probable that the so-called Mt. Hammond is the Mt. Nelson of David Thompson, the first white man to visit the Upper Columbia Lakes, as far back as 1807.—Ed.



camera, but I believe the anxiety he felt for our safety was almost as great a strain on him as the trip would have been.

Now that Hammond has been climbed, and the elevation proclaimed as 12,125 feet—we can only give the barometrical readings—it may be proved higher or lower by triangulation. It will hardly fall much below 12,000 ft. If it ever loses its supremacy it will give it to one of its sisters. I have no hesitation in saying that I am sure there are higher altitudes nearer the divide of the Selkirks in the vicinity of the headwaters of Toby Creek.

ACROSS THE PURCELL RANGE OF BRITISH
COLUMBIA.

BY T. G. LONGSTAFF.

*Reprinted from the Geographical Journal by kind
permission of the Editor.*

The Selkirk system of British Columbia is usually described as consisting of the Selkirks proper on the west and the Purcell range on the east. The "Nelson's mountains" of David Thompson's map include the northern end of the Selkirks and nearly the whole of the Purcell range. I am inclined to think that his "Mount Nelson" in the latter range, obviously a particularly prominent mountain, can be identified with the peak now known as Mount Hammond. At any rate, both are in the same neighbourhood, and Dawson's "Reconnaissance Map" of 1886 places Mount Nelson in about the same position. Since the name Purcell range is not in use locally, it seems a pity that such an opportunity was not taken to perpetuate Thompson's nomenclature. But the title has been officially adopted, and must be adhered to.

Though the Purcell range is generally admitted to form part of the Selkirk system, Dawson has adduced arguments for considering each as totally distinct from the other. In any case, its natural boundaries are unusually obvious. It is separated from the Rocky Mountains on the east by the valleys of the northward-flowing upper Columbia River and of the southward-flowing upper Kootenay River, which together constitute a part of the great Rocky Mountain trench, one of the most remarkable features of the North American

BRITISH COLUMBIA
Outline Sketch
of the Northern part of
PURCELL RANGE
from
Provincial Mining Maps

Scale 1:250,000 on 1 Inch = 11.155 Stat Miles

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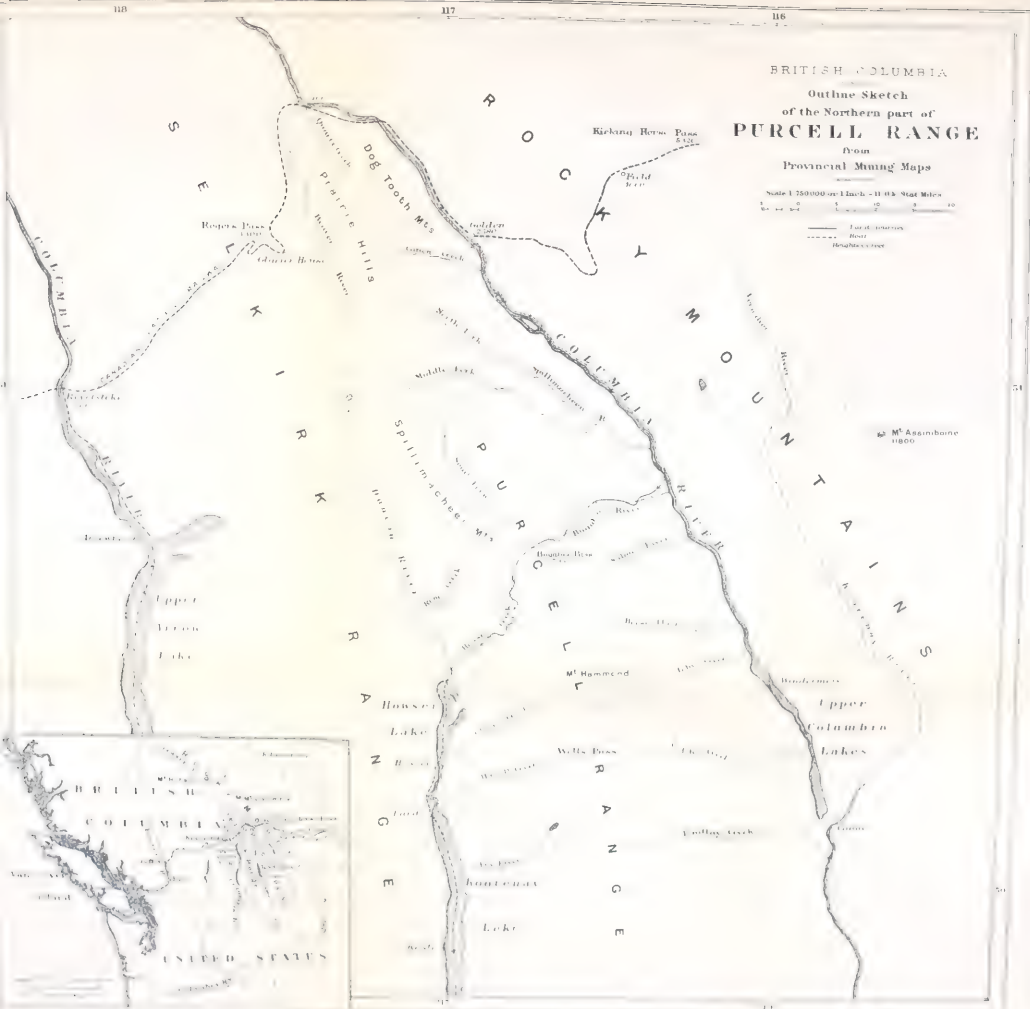
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Cordillera. The Purcell range is separated from the Selkirks proper on the west by a smaller but equally well-defined trench, which Daly (*Geographical Journal*, vol. 27, p. 600), has aptly designated the Purcell trench. The northern end of this trench is represented by the valley of the northward-flowing Beaver River, whose confluence at an acute angle with the upper Columbia River forms, in fact, the northern boundary of our range. Crossing the low (4600) Beaver-Duncan divide, the Purcell trench continues southward, occupied successively by the southward-flowing Duncan River, Howser Lake, the long fjord-like north and south arms of Kootenay Lake, and the northward-flowing lower Kootenay River, whose acute-angled bend in Montana forms the southern boundary of the Purcell range, just as the Big bend of the Columbia River forms the northern limit of the Selkirk system. The remarkable courses of these two great rivers, the Columbia and the Kootenay, can hardly escape comparison with those of several rivers of the Himalayan region. The Selkirks, including the Purcell range, are much older than the Rocky Mountains; they represent in this region and for a distance of 300 miles the original main axis of the North American Cordillera. As in the case of the two great Himalayan ranges, the younger range is now higher than the older. On the other hand, in the North American Cordillera it is the younger Rock Mountain range, and not the older Selkirk range, which now constitutes the main water-parting.

The Purcell trench and the corresponding portion of the great Rocky Mountain trench run approximately parallel to one another in a north-western to a south-eastern direction. The figure of the Purcell range may therefore be described as that of an elongated lozenge having a length of about 250 miles, and for half this distance an average breadth of about 50 miles. The

southern half of the Purcell range, like the southern half of the Selkirks proper, attains no great altitude, and is crossed by the Crow's Nest railway and by several trails. But the northern half rises well above the snow-line into numerous bold glacier-draped peaks. In this portion of the range the surface or drainage area of the eastern slope is uniformly greater than that of the western slope. Precipitation comes primarily, of course, from the Pacific.

The Dogtooth Mountains and the Prairie Hills at the northern extremity of the range have been accurately surveyed by Wheeler. South of these are the Spillimacheen Mountains, a portion of which are indicated on Drewry and McArthur's sketch-map of 1892. The same area is shown in outline on Mr. F. C. Lang's prospector's map. The headquarters of the south fork of the Spillimacheen, Bugaboo, and Salmon River on the east, and of the Reno and Howser creeks on the west, were obviously unsurveyed, and are very imperfectly known to a few trappers and prospectors. South of this, again, trails run westward into the mountains at the sources of Horse Thief Creek, where the scenery is reported to be very fine. In this section is situated Mount Hammond, the first ascent of which was accomplished by Mr. Ellis, of Windermere, in 1910. Its height is reported to be over 12,000 feet, but this estimate requires confirmation.

South of this, again, comes the fine trail from the lower Columbia lake, now known as Windermere lake, to the head of Kootenay lake. This pass over the Purcell range has long been known as Wells pass, and is so shown on the Provincial outline map, but the name has recently been changed to Earl Grey's pass, the changing of geographical nomenclature being unfortunately only too common in Western Canada. Those well-known peaks, the Hermit and Mount Carrol

on either side of Rogers pass, are now shown on the Dominion maps as Mount Tupper and Mount Macdonald, and I heard with regret that the name of Wild Horse peak, east of Fort Steele, is to be changed to Mount Fisher. South of Wells pass the mountains begin to decrease in altitude, and the country, though by no means fully explored, appears to be of less interest.

The suspension by the Dominion Government of topographical surveys in the Alpine ranges of Canada leaves the would-be explorer with a very wide range of selection, but the imminent opening up of the upper Columbia valley by the Canadian Pacific Railway indicates the northern half of the Purcell range as a particularly desirable field for mountain survey work, and I at once fell in with the suggestion of my friend Mr. Arthur O. Wheeler, the well-known mountaineer and lately Topographer to the Department of the Interior, that we should endeavor to cross the range together, and make a survey of the glacier region traversed. We were fortunate in getting Mr. Byron Harmon, of Banff, Alberta, whose Canadian mountain photographs are so deservedly popular, to come with us, and the services of Konrad Kain, the Austrian guide engaged for the summer by the Alpine Club of Canada, were placed at Wheeler's disposal.

We left Golden before sunrise on August 30, 1910, in Captain Armstrong's stern-wheeler, and steamed up the Columbia river for about 40 miles. Dawson describes the upper Columbia valley "as a great flat-bottomed, parallel-sided trough." Its average breadth between the confining mountain slopes is about 5 miles. It is markedly terraced into typical bench lands. The river itself flows tortuously through a depression half to 1 mile in width, containing numerous sloughs.

The upper Columbia river flows down a great strike valley of pre-glacial origin, which probably dis-

charged southward, and is now deeply filled with drift-material. Its eastern boundary is formed by the steep escarpment of the Beaverfoot range of the Rocky Mountain system, which here presents an almost continuous wall of bare limestone peaks. The flanking line of the Purcell range on the west present gentler outlines thickly covered with forest, and only assume a rugged character on nearing the main axis of elevation.

Near Spillimacheen landing Captain Armstrong pointed out to us a fine snow-peak to the west named by him, in 1886, Mount Ethelbert. We disembarked at Haffner's landing on the west bank and pitched camp, being joined in the evening by W. B. Barrow and Charles Lawrence with a pack-train of ten horses. We could hear of no trail across the northern half of the Purcell range except Wells pass along Hamill and Toby creeks. The southern part of the Spillimacheen country was said to be quite impassable for horses. But up the river entering the Columbia between the Spillimacheen and the Salmon, and rejoicing in the name of Bugaboo creek, a trail was known to have been cut some years ago by miners. I learned recently, that one winter about twelve years ago Wells and another pioneer crossed the range on snow-shoes by this route, which we subsequently followed. Local information was to the effect that the main divide at the head of the Bugaboo was impassable for horses, but that Reno creek headed from the reverse slope, and would, if we did force our way over, afford access to the valley of the Duncan river. This turned out to be fallacious, for Barrow successfully got our pack-train over the divide, and on the further side we found ourselves descending Howser river and not Reno creek. Wheeler's idea was to cross the divide to the Duncan valley, and, travelling, north to connect his surveys with his old stations on the Prairie hills, returning to the Columbia

by another pass over the divide of which we had heard vague rumors. But the country was really unknown, and the actual difficulties turned out to be far too formidable to render such a scheme practicable in the month at our disposal, for the risk of being blockaded in the mountains by an October snowfall had to be reckoned with.

From our camp a good trail led for the first few miles through bench lands clothed with jack pine. Passing to the south of the lower canyon of the Spillimacheen, the trail strikes westward along the northern bank of the Bugaboo river. It becomes rapidly worse after the first 15 miles. In several places it had completely disappeared, and burnt down timber soon called for the axes and involved frequent detours. In one stretch a forest fire was still smouldering in spite of heavy rain all through the previous night.

On the third day after leaving the Columbia, Wheeler selected and occupied a station on the north side of the valley at a height of 7663 feet, while Harmon went up the valley with one of the men to clear a trail for the horses, returning in the evening greatly elated by what he had seen of the remarkably fine glacier at the head of the north fork of the river.

I should here state that the whole of the survey work on this trip was executed entirely by Wheeler. The map, unfortunately for me, is not yet to hand, and the nomenclature is his. Any discrepancies between my paper and Wheeler's map must be resolved in favor of the latter. Wheeler occupied ten stations between 7000 and 9000 feet in altitude. The theodolite and survey-camera outfits each weighed about 25 lbs., which Wheeler and Konrad had to carry almost daily up very steep wooded slopes to the bare summits, the ascent being excessively fatiguing, not so much from the actual height which had to be made, as from the slippery foot-

ing and the constant impediment of the vegetation to every upward movement. From this first elevation we saw to the west the upper reaches of a very fine glacier, cropping out of which were a cluster of remarkable peaks. This glacier rises from a group of mountains, the highest of which attains an altitude of 10,244 feet, and was named by Wheeler Howser peak. It turns out to be the highest peak on this part of the divide.

Leaving him at work with his instruments, I scrambled down to the north into a typical alpine hanging valley, showing all the usual signs of glaciation, which cut us off from the Spillimacheen divide. On both sides of the main valley steep hills rise abruptly. Their lower slopes are clothed in forest, and their bare rocky crests, rising on the south side to over 4000 feet, are snow covered. This southern range is dominated by seven peaks, and has therefore been named the Septet range. Ravines, deeply cut by broken mountain torrents run up into the recesses of the mountains, affording only a very arduous means of approach to the snows.

On September 3 the whole outfit moved on up the valley, here very narrow, keeping to the left bank of the stream. A remarkable spur of bare rock, which I presume gives the name to Rocky Point creek which flows in from the north, almost forced us to take to the water. For some time we had heard the roar of a waterfall ahead of us, and soon came to a clean step-like ledge over which the whole river is precipitated with a clear drop of between 40 and 50 feet. Above this the valley floor widens out somewhat, and keeps very level right up to and beyond the main forks of the river, suggesting the approach to a region of relatively recent glaciation.

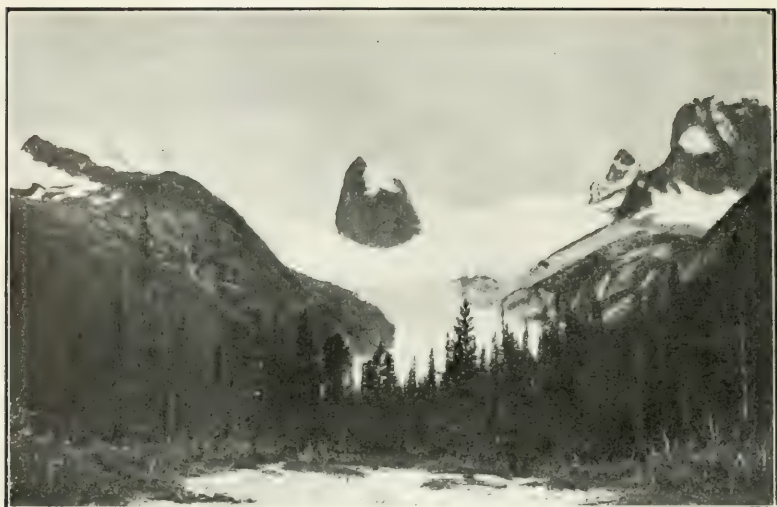


Photo Byron Harmon

NORTH FORK VALLEY, BUGABOO CREEK



Photo Byron Harmon

A CLUSTER OF PEAKS "THE NUNATAKS"

On reaching the forks we had a very beautiful view of Harmon's big glacier, which descends right down to the level floor of the valley well amongst the timber. The "north" fork of the valley runs about east and west, and at first sight appears to be the termination of the main valley. Harmon and I afterwards visited this glacier, and found that its present phase was one of retreat. The ice itself is very clean, and the contrast of colors when seen through the heavy timber is very beautiful. The lateral moraines are well developed and rise high above the shrinking ice. Two fine ice-falls occur in the middle section of the glacier, which is about half a mile broad.

The "south" fork is the main stream of the Bugaboo river, and it was from the head of this that we hoped to get our horses over the divide. We therefore forded the "north" fork and, turning southerly, followed an old miners' trail through dense heavy timber. This led for about half a mile along a ridge which had exactly the form of a lateral moraine. Owing to the undergrowth and the short time at our disposal, proper examination was impossible. But I am inclined to believe that this was in fact a relic of some extremely remote period of ice increase. Its survival at this particular spot can easily be accounted for by the configuration of the valley at this point, a long spur forcing the river over on to the other side above this remarkable formation, and thus protecting it from undercutting.

The old trail through the heavy timber was frequently completely blocked by fallen giants, and several of the sorely tried horses fell. Late in the afternoon we were stopped by a tremendous windfall, which had been caused by an avalanche from the opposite side of the valley. For hundreds of yards the trees were piled in impassable confusion. After some delay we managed to get down into the open muskegs of the valley bottom.

which at this season were, fortunately, passable. Our line of march was again westerly. The valley had broadened out to about a mile, the bottom being quite flat, and consisting of grassy muskegs interspersed with small thickets of willow and small timber. To the south a glaciated valley hung 500 feet above us, several waterfalls being visible through the trees. About 5 miles from the forks, we camped on a low gravel bench (c. 4500 feet) beside the torrent, now shrunk to very small dimensions. This spot was our headquarters through a week of broken weather during which Wheeler worked away at his survey whenever possible, and we thoroughly explored the neighbourhood and the pass at the head of our valley.

Wheeler's station, at 7677 feet on the culminating point between the north and south forks of the Bugaboo river, gave us an excellent view of our surroundings. To the south-east the seven peaks of the Septet range separated us from the valley of the Salmon river. To the south a semicircle of glacier-hung peaks cut us off from the south fork of Howser river. To the west was our intended pass across the divide, Howser peak, and the remarkable nunataks or aiguilles rising out of Harmon's big glacier. To the north a lower range marked the divide between the Bugaboo and Spillimacheen rivers. To the east the distant peaks of the Rocky Mountains showed through the haze of the Columbia valley.

The extreme limit of timber growth, here represented by larch scrub, is approximately 7400 feet. The height of the pass on the divide to the west, which, I suppose, must retain the euphonious name of Bugaboo, is about 7160 feet. The old Bugaboo claim, an outcrop of galena, lies on the actual crest of the pass between two large beds of permanent snow. On the further side a valley ran west of south, and, relying

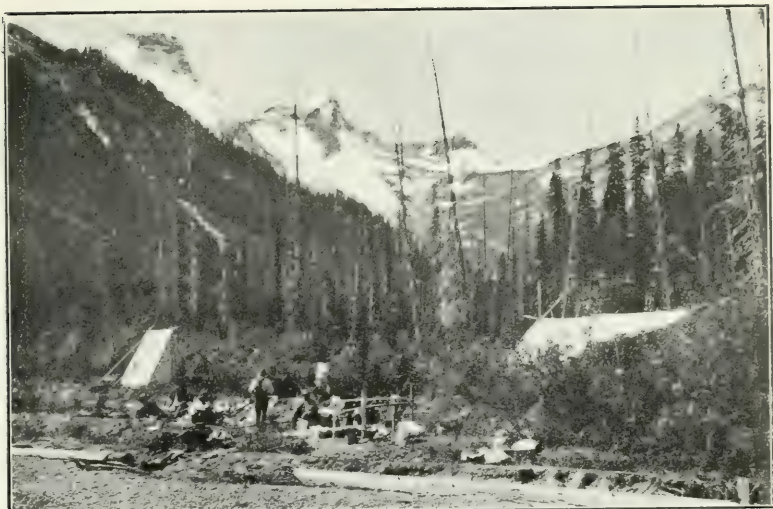


Photo Byron Harmon

THE BUGABOO-HOWSER DIVIDE



Photo Byron Harmon

CROSSING HOWSER PASS



Photo Byron Harmon

PEAKS AT HEAD OF HOWSER RIVER



Photo Byron Harmon

VALLEY OF HOWSER RIVER (Below the Pass)

on information received, we assumed that it was that of Reno creek. As a matter of fact, it was Howser creek. We could only see the extreme upper end of this valley, which, though deep, was open and fairly wide. It soon turns further to the south, and rapidly contracts lower down, where the torrent flowing between steep forest-clad spurs has deeply eroded it.

By hard work we cleared out the old prospector's trail, which led through dense brush to the foot of the steep and rocky final slope of the pass. After a good deal of digging it proved to be just practicable for the pack-horses, and Barrow negotiated it with great skill and no fuss on September 9. Wheeler, with Konrad, occupied a station of 8081 feet to the north of the pass. I remained on the crest to prepare a light camp for the surveyor, while the pack-train pushed down into the valley on the other side. Some wide-bent balsams offered a chance of shelter, and here I pitched a light silk tent and collected wood. The intention was that Wheeler should occupy another station on a prominent peak to the south of the pass, but a snowstorm that night prevented a start in the morning. We stayed on in our eyrie, hoping for better conditions; but another 6 inches of snow fell during the second night, and we packed our bedding down to headquarters in disgust.

On September 12, Wheeler and Konrad returned to the pass, picked up the instruments left there, and successfully occupied the selected station (8254 feet) south of the pass. On the same day Harmon and I visited a large glacier flowing west down towards the valley from Howser peak. Mounting a steep rocky spur of this peak to a height of about 9250 feet, we obtained for the first time a really comprehensive view of the region.

The contrast between the formerly ice-protected alp-lands and the forest-clad depths of the torrent-eroded

lower valleys was most marked. An unexpectedly large portion of the Purcell range was seen to be covered by glaciers and perpetual snow. The most striking peaks were amongst the wild Spillimacheen mountains to the north, but the snow area was greater and the altitude of the range was higher to the south. The culminating point appeared to be a peak about 20 miles to the south. From the remarkable arrangement of cliff and glacier we called it, for purposes of reference, Eyebrow peak. This may turn out to be Mount Nelson or Mount Hammond, which again, as I have already pointed out, may be identical. But I think Wheeler's peak is somewhat too far north. No direct transit readings were taken to the summit, but by the methods of photo-topography an altitude of 11,489 feet was deduced, with a range of only 37 feet for three different computations. Another fine mountain south of the main forks of Howser river, and giving birth to several large glaciers, has been named Mount Aurora. To the west a group of peaks, rising to 9743 feet, and named by Wheeler the "Four Squatters" hung over the misty depths of the Duncan valley, and beyond this, again, were the snowy ranges of the southern Selkirks. Eastward the continental divide of the Rocky Mountains loomed mistily through the smoke-haze of the forest fires then raging in distant Washington.

From our camp at the head of the valley—that is to say, at the west foot of the pass we had just crossed—to the forks where the southerly and northerly arms of Howser river unite a distance of less than 12 miles in a straight line, cost us six days of hard labor. We only made four marches with the horses, but on the other days we cut trail ahead, returning to camp in the evening. We were constantly compelled to ford waist-deep from one side to the other of the broken torrent to avoid the steep cliffs which bordered this

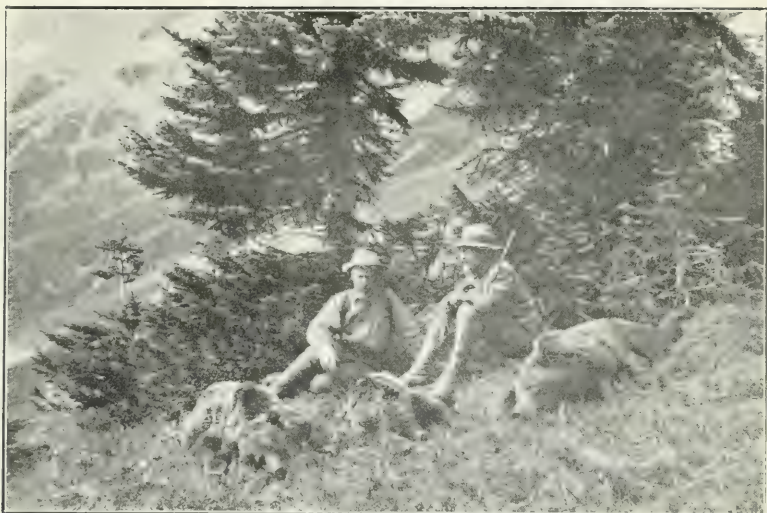


Photo Byron Harmon

A DAY'S HUNTING AT HEAD OF HOWSER VALLEY



Photo Byron Harmon

DRESSING THE SKINS

section almost continuously. A striking feature of the valley is the beauty and frequency of waterfalls in the side glens. Meanwhile Wheeler continued to occupy high stations, as day by day we made 2 or 3 miles down the valley. The labor of climbing up several thousand feet through undergrowth full of poisonous devil's-club was extremely exhausting and I found cutting trail with Harmon and the men a much lighter job.

The forest growth on the western slopes of the range is much denser than on the eastern side, and, in consequence, insufficient grass for the horses was a constant source of anxiety. Larch, balsam, spruce and hemlock gradually gave place to cedar, white pine, and Douglas fir, with cotton wood, at Forks Camp (c. 3000 feet). Underneath was a dense growth of azalea and blueberry, while the horrible prickly aralia, or devil's club, was everywhere. In places subject to spring avalanches the hillsides are clothed with dense alder, all bent downwards by the weight of the winter snow, and costing much labor to cut through. They are known locally as slides.

On September 18 we reached the point where the north and south forks of the Howser unite, and camped, at about 3000 feet, in a magnificent cedar forest. From this camp Wheeler occupied a station on a high shoulder of the Four Squatters. Due south was the pyramidal cone of Mount Aurora, sending down a large glacier into a hanging valley, the stream from which discharged into Howser river below our camp.

Since crossing the divide we had seen no sign of a trail, though a trapper had obviously wintered in the valley some years previously. And when, on September 20, soon after leaving Forks camp we crossed the river, now only just passable on foot, and came upon an old trail, we thought that our troubles were

at an end. We were soon forced to cross over again to the right bank, this time by felling a tree, only to recross a few hundred yards lower down. Soon after this third crossing we fell in with a trapper who was bringing up his supplies for the winter. He told us that we were on Howser and not Reno creek, and assured us that it was impossible to get horses down the lower canyon, the old trail being carried on staging which was now either rotten or altogether carried away. Owing to the danger of avalanches, he himself would be a prisoner in the valley above this canyon from the first heavy snowfall till after the spring melting.

There was nothing for it but to send our pack-train back over the pass to the Columbia river. Wheeler accompanied it, as he had now to connect up his survey from the other side. Harmon and I walked down with the trapper, doing the 15 miles through the canyon to the Duncan river on September 22, and reaching the hospitable settlement on Howser lake the next day.

As a result of our observations, I feel confident in placing the highest and most glaciated portion of the Purcell range to the south of our pass, and not, as local reports at first led us to believe, in the Spillimacheen mountains to the north. The mountains between Wells pass and the Bugaboo pass may fairly be considered as unexplored ground, and are certainly unsurveyed. The great extent of the snow-fields and the general altitude of the range was quite a surprise to me, and is not, I think, generally appreciated. It undoubtedly offers a very attractive field alike to the topographer and the mountaineer. While access to this region is probably easier than to the Spillimacheen mountains, no attempt should be made to take a pack-train, except from the Columbia valley side, and, with



Photo Byron Harmon
THE STREAM BECAME TOO SWIFT TO WADE

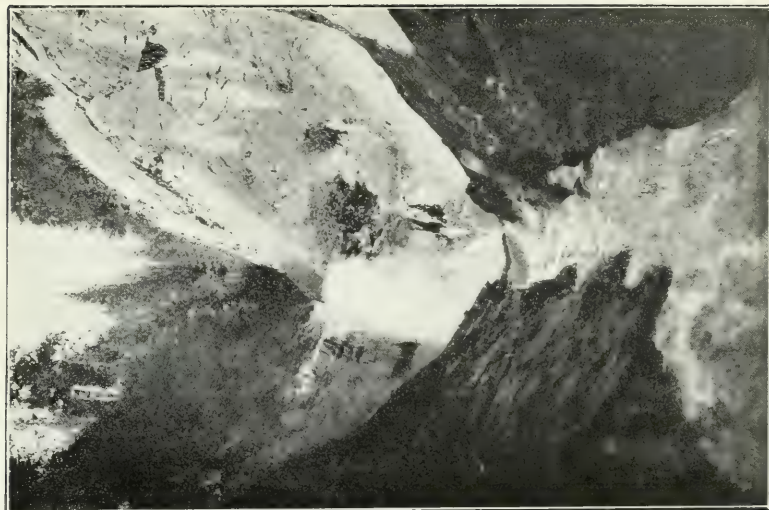


Photo Byron Harmon
A BEAUTIFUL LATERAL VALLEY

the possible exception of an old trail down Glacier creek, which is really only a variation of Wells pass, no attempt to get horses over the divide and down to Howser lake is likely to be successful. Horses can be taken up the valley of the Beaver river, over the divide, and on to the upper Duncan river, but they cannot be taken through the valley of the lower Duncan river down to Howser lake, owing to a canyon similar to that which stopped our pack-train on the lower Howser river.

TWO FIRST ASCENTS IN THE ROCKIES.

BY J. W. A. HICKSON.ASCENT OF MOUNT DOUGLAS.
(11,200 FEET)

When on a clear day, one is looking almost due north-east from Mt. St. Piran or Fairview—in the immediate vicinity of Lake Louise in the Canadian Rockies—a large, lofty peak (about 14 miles distant in direct line), with massive top, black in July but usually covered with snow in the early and late summer, irresistibly attracts attention. Considerably higher than the immediately surrounding mountains, and lying south-east of the well-named and easily recognizable Mt. Molar, it is so conspicuously isolated that it is likely to strike the eye of even the most casual observer. It was named, as early as 1886, by the late Dr. George Dawson, after the Botanist, David Douglas.

At least six years ago, if not earlier, an attempt, of which I have been unable to obtain an account, was, I believe, made to ascend it by an American alpinist, with the well known guide, Kristian Kaufmann, of Grindelwald. The reason why this attempt could not have succeeded was clear to us afterwards. Three persons are necessary to overcome one of the first main obstacles. Again in the beginning of September, 1907, a strong party consisting of Mr. L. M. Earle of the English Alpine Club and a couple of friends, with the two Swiss guides, Edward Feuz, Sr., and his nephew, Gottfried Feuz, both of Interlaken, made another attempt, a brief account of which was given in the Journal of the A. C. C. for 1908 by the

Editor, who contributed a good photograph of this so-called double peak. Mr. Earle made the first ascent of the north-west tower, which is estimated at about 11,000 ft. and declared it to be not difficult. It is the slightly higher south or south-east tower, about the height of Mts. Lefroy or Deltaform, which in my opinion is a quite distinct mountain, quite as distinct from the north peak as is for instance Mt. Lefroy from Mt. Victoria, that has presented formidable difficulties. On some maps this peak is un-named, and the lower peak is marked Mt. Douglas. No traversable *arête* connects these two peaks with one another, and it would be almost impossible to climb both of them on the same day, even though the higher peak is now partially roped.*

These unsuccessful expeditions had, naturally, excited the ambition and made this peak, which we shall call Mt. Douglas, the envy of all active mountaineers who visited the Lake Louise district. Now the present writer confesses to being one of those on whom a virgin peak, popularly reported to be impracticable, exerts a very potent attraction. Determined to see for himself wherein consisted the difficulty of an ascent, he started up the Ptarmigan Valley in the third week of August, 1909, with two Swiss guides, a packer and several pack horses, and in a day's march reached a camping ground in Baker Creek Valley about four hours' tramp from the base of the mountain. But alas! the weather, which looked none too favorable when we set out, grew steadily worse on the following days. Almost hourly snow flurries succeeded one another for the next thirty-six hours, which on the higher peaks deposited a foot of fresh snow, and rendered the vertical cliffs of Mt. Douglas, which

* On Dawson's map, 1886, the name Mt. Douglas is applied to the northern peak. When the Dominion topographical survey of the district was made, the name was given to the massif from which both peaks arise, and has since been confirmed by the Geographic Board of Canada.—Ed.

were closely inspected, too dangerous to attempt, coated as they became when the weather cleared up with a treacherous *verglas* from the melting snow higher up. After several days spent in making a couple of minor first ascents, and in mapping out the route of what we hoped would be a successful attempt on Douglas later on, we were obliged to return to Lake Louise.

Eleven months afterwards we were able to realize our desire. In the second week of last July, after ten days stay at Lake Louise, I started again northward via the Ptarmigan Valley, accompanied by Edward Feuz, Sr. (to whom I shall refer in the following account as Feuz), and his son Edward, who had been with me the year previously, and who has been a climbing companion during several seasons in the Rockies. Two packers and four pack horses to carry our tent and ten days' supplies completed the outfit. It was my intention to spend a week, if necessary, in laying siege to this mountain.

Mt. Douglas is approachable from Laggan, not only through the Ptarmigan Valley, but by the way of the Pipestone River and the Little Pipestone to the headwaters of the Red Deer. Thence a short valley leads south-east by the west side of the north tower to the foot of Douglas snowfield and glacier. This is the longer, though perhaps more interesting route and is the one by which we returned to Laggan; but it requires at least two days, whereas Baker Creek can be reached in one day from Lake Louise. Both camping grounds are about equally distant from that part of the south tower on which the really hard climbing begins.

We made good time to our camping ground which was reached in about six hours from Lake Louise, the trail being in quite excellent order. On the way the retrospective views of the Ten Peaks and Mt. Quadra in Consolation Valley were exceedingly fine. During the latter part of the trip one passes Ptarmigan and Baker

Lakes which are connected together and lie in a large bed just beyond the top of Ptarmigan Pass (7600 ft.). Here a good view of the south tower of Douglas is obtainable. A considerable amount of snow was lying on the west shores of the lakes, from which the trail descends several hundred feet to Baker Creek. Our camp was pitched at about 7200 ft. on the north side of the Creek, alongside of a unique sort of waterfall, which fell like a thick ribbon over smooth ungrooved slabs of perpendicular rock. Good brush for our tents was close at hand and was gathered in by the Swiss and myself, while the other men were getting the packs in order and preparing the evening meal. It was evidently the site of a former camp, for we found not only dried brush wood, but a couple of suspicious *pitons*, quite suitable (though not employed by us) for mountaineering purposes. After supper we explored the upper part of the wood and the grassy slopes above us. From some exposed rocks we had excellent views to the south, east and west; but our objective peak was not visible. It was shut out from view by a pass to the north, which we had to cross on the morrow. A small tree was cut down and prepared for our next day's work, Feuz having got it into his head that it would be helpful at the most difficult chimney which had baffled the party he had led three years before. It turned out, however, to be a superfluous piece of baggage. A glorious evening promised another fine day, and we went to bed at nine o'clock feeling quite happy about our prospects.

After attending to more than the mere formalities of breakfast, the Swiss guides and myself left our camp at 5 o'clock on July 12th in perfect weather which seemed likely to continue for at least twenty-four hours; so we felt that it would not be necessary to rush things in order to get in the climb. Feuz even said that it would not matter if we had to stay out all night and that this was

not altogether improbable. Before starting we instructed the packers to transfer the camp during the day to the small valley already referred to, leading from the Red Deer south-eastwards to Douglas Glacier, as we wished to vary our route and also be in a better position for reaching some of the mountains west of Mt. Douglas and the Pipestone.

Proceeding at an easy pace up the short bit of spruce wood above the camp, and over the rough grassy slopes we soon reached the plateau which affords an entrance to the first pass of our route. It was easy going up here, although the tree was something of a drag, partly over screes and partly over snow which was in good condition—with Mt. Adrian (so-named by Mr. Earle) on the right and a sharp ridge of which we made the ascent the year before on the left—to the summit of the pass, about 8,900 ft., which was reached in two hours. From here, whence one obtains an excellent view of the “double peak,” particularly of the flat-topped south tower, a short sharp glissade brought us down to the snow-covered glacier which was easily traversed. Then turning to the right we reached the rocks, three hours from camp (where we had *cached* some apparatus a year before) on the col joining the ridge of Mt. Adrian with what was once a shoulder of Mt. Douglas but which is now separated from it by a perpendicularly cleft gap several hundred feet in width, forming a large rocky bed or trough between it and the main part of the south tower. A steep descent of at least 500 feet had now to be made, for the most part backwards—the guides going first and kicking out the steps—to the névé basin on the south of our peak. Then came a long and tedious snow grind around the detached portion of Douglas up to the rocky bed or saddle already referred to. During this detour Edward had to expend considerable energy as he had latterly assumed the burden of carrying the heavy and useless pole. On the way

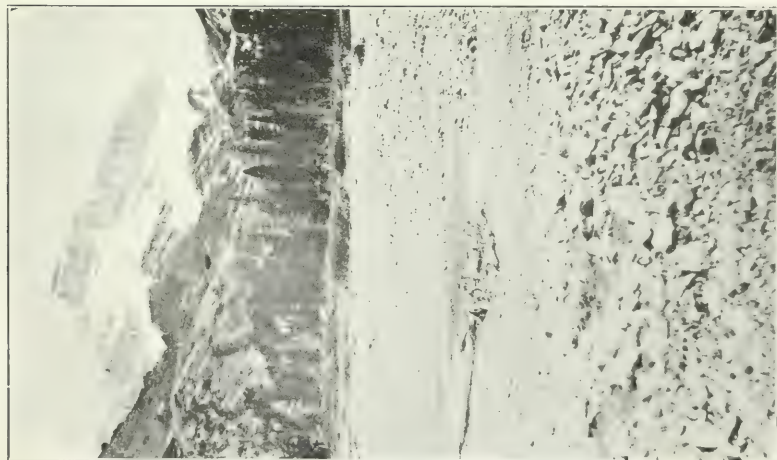


Photo J. W. A. Hickson
MT. DOUGLAS (South tower) FROM THE WEST,
SHOWING THE GAP



Photo J. W. A. Hickson
CLIMBING ON MT. QUADRA

we had a good opportunity of examining the south and south-east faces of the mountain but could not discern any feasible way of ascent on these sides. The north face is certainly impossible. There were no difficulties on this portion of the climb, but shortly before reaching the trough, Feuz, whose caution is proverbial, insisted that he and I should rope together. As we were proceeding up the gap, a large mass of rock fell on our right from the main body of Douglas and warned us of the danger of keeping close to the wall. It was about 9.45 a.m. when we entered the gap. An hour later we gained the cliff, on the south-westerly side of the south tower where the really difficult climbing began.

Shortly after 11 a.m., having fortified ourselves by a too long delayed second breakfast, we commenced the stiff part of our day's work. About 20 ft. above us and to the right there hung the end of the rope which was the reminder of the operations of the party of three years ago. It was threaded through a narrow crack and doubled around some convenient chock-stones. But before it could be reached a hard bit had to be surmounted. It consisted of a short chimney, almost totally devoid of handholds, with a repelling, overhanging top. In attempting to get up into it one's head very soon tested the solidity of its rocky roof. The "three man trick" is necessary in order to overcome this obstacle. Edward was pushed up by his father, who in order to get up into the chimney availed himself of my shoulders. The leader, thus supported, was enabled to grasp a couple of slender holds on the outside of the roof of the chimney and thus pull himself over it. He had then to make a quick movement to the right around a sharp corner in order to reach the foot of the less difficult crack from which Mr. Earle's rope was dangling. This rope was tested, used by the leader, and after Feuz had ascended, let down to me. I was very glad of a strong pull; indeed it was in-

dispensable. On gaining the top of this second crack, which was not accomplished without considerable bodily strain and accompanying breathlessness, a good platform was reached here we could all comfortably stand. From here fairly easy rocks connect with the base of some vertical and practically ledgeless slabs that offer almost no footholds or safe places for anchoring the rope. Then comes the *impasse* where Mr. Earle's party had stuck; a chimney of about 25 ft., quite vertical and bulging forwards at the top.

The nature of the place is such that there is no possibility of giving the leader a shoulder up or of assisting him in any way whatever. For there is room for only one person to stand either at or near the foot of the chimney. The looseness of the rocks on its left wall makes one hesitate to put much strain on the handholds; and a large rock somewhat blocks the entrance to it. It was here that Feuz, Sr., thought that the pole, which had with so much toil been dragged up nearly 4,000 ft., would prove of great value by enabling the leader to climb up it into the chimney without using its precarious sideholds. But there was no possible chance of resting the end of it on any secure foundation; and a slip of it would have assuredly meant disaster.

In order to give the guides the full use of the ropes, I now untied and stood on a comfortable and secure ledge about thirty feet below the chimney. In the meantime, the second man had climbed up to the top of the smooth and slippery slabs of rock on the right of the chimney where he had a good footing, but found it exceedingly difficult to belay the rope, while the leader began making efforts to pull himself up into the chimney. This was, for the reason just stated, a work not only of real difficulty but of considerable danger. Did the disintegrated rock of its left wall give way he must inevitably tumble backwards and could have been held only with the great-

est effort and then provided that the rope did not cut. Fortunately, he had lower down changed his heavy nailed boots for a pair of strong, but light cotton soled ones (an improvement on the roped kind) and which undoubtedly contributed to our success. After about an hour's work at this place—during which the last man was completely inactive, and would have been half frozen at nearly 11,000 ft. except on a fine warm day—I began to fear that we, like other parties, should be obliged to retire from the cliffs of Douglas discomfitted, more particularly when remarks were overheard from Feuz, which I interpreted as meaning that the *Herr* should be told there was no prospect of success, and that it was advisable to turn back. I called up to know what was the matter. Feuz replied: "You had better come up and look for yourself." I was preparing to do so, remarking at the same time that we could make another attempt to-morrow from some other point on the southern side, when Edward called down to me to remain where I was as he intended making another effort.

From my place of vantage I could by leaning out a little see him groping above with his hands to test the soundness or unsoundness of the rocks; then he pluckily took a chance and made the crucial move, which was successful. By a vigorous pull, during which we were all anxiety, he drew himself into the chimney where, standing for a couple of minutes fairly secure with his face toward its vertical walls, he waved his arm and I felt that Douglas was captured. The remainder of the chimney is not so dangerous (on the ascent) but every bit of it is hard; knees and fingers being much in demand, while to pull one's anatomy over the inclined top without the aid of the rope, demands strong fore-arms and generally good muscles. One lands in rather a floundering way on a broad scree-covered ledge, about 500 feet below the summit. Feuz, now assisted by the rope which was se-

cured around a support at the top of the chimney, followed his son. They then let down the rope about 70 ft. to me, and I got up safely (after a few halts to regain my breath), firstly over the smooth slabs to the base of the chimney, and then through the chimney itself, the ascent of which entails an exhausting bit of sheer muscular exertion. I knew that it would be an exceedingly nasty bit to descend; but for the moment tried to dismiss the thought of what it meant. One feels, and it seems to me with reason, that armed with the requisite paraphernalia, a party of two or three can always *somehow* get down where they got up.

This was, as anticipated, the crux of the climb. No serious difficulty was afterwards encountered; but, of course, we could not be certain of this and when we saw some ice ahead felt rather uneasy lest our axes, which had been left (one of them unintentionally) where the difficult rock-climbing commenced, might not be required. The snow, however, was not so hard as it looked, could be crossed at a very easy angle and did not extend far. We soon left it for the rocks connecting with the south-eastern *arête* which leads to the shaly bed that forms the remarkably broad slope of the summit. It would afford room for a good sized hotel. The top which had the inevitable and enormous cornice—this time on the northern side, the cliffs of which descend absolutely precipitously for several thousand feet and are assuredly unscalable—was reached at 2.45 p.m. We claimed a first ascent; "the first mountain I have climbed without my ice axe," declared Feuz, Sr. Two cairns were built and a record left. The view was disappointing, firstly owing to haze, which bedimmed the southern panorama; and secondly, owing to the lack of any effective foreground to the north. The immediately surrounding peaks are low and of uninteresting contour. One of the highest, Mt. McConnell about 10,000 ft., though unclimbed, is un-

doubtedly very easy ; just a *Steinhaufen* as the guides said. We selected a better shaped and un-named one to the west, separated from Mt. McConnell by a fine and apparently advancing glacier for a later climb which was carried out two days afterwards.

Although a warm day, a cool wind from the north, from which we had been protected lower down, cut short our sojourn on the summit. Starting down a few minutes before three o'clock we were soon again at the *mauvais pas*, the descent of which was not an attractive prospect. A strong English alpine rope, 80 ft. long, having been belayed around an angular rock at the head of the chimney, Feuz, whom his son and I both held on a second rope, went down first, through the chimney, over the lower slabs of rocks, which afforded practically no handholds, to the place where I had stood earlier in the day, inactive for an hour ; his descent being accompanied by alternate cries of "*halt*," "*los*" repeated frequently according as he wished to rest for a few seconds or required more rope. On his unroping the rope was pulled up and I prepared to follow. My state of feeling was not wholly pleasureable as I knelt on the edge of the overhanging rock to let myself over it into the chimney. One could see nothing whatever directly underneath. I shot into it rather too quickly for my bodily well-being. But my sensations were still more unpleasant when, after emerging from the chimney with only a slightly bruised knee and having attained a firm foothold at the top of the slabs, stimulated by the encouraging remarks of Feuz, I unwarily pushed off too vigorously with my feet in order to clear the rocks and the rope which had been caught anglewise at the foot of the chimney now becoming straightened, I swung out over the cliffs. I was really quite safe though I hardly felt so for a few seconds, but might have experienced a little difficulty in finding a resting place had not Feuz pulled

in the end of the rope which lay at his feet and thereby swung me gently in to where he was standing. I again felt forcibly that the descent of a difficult mountain is more trying than is its ascent. The last man had the more dangerous work to do of coming down unassisted on the single rope, one end of which he tied around his body. However, he reached us in safety, with only a few scratches. As there was no means of repossessing ourselves of the 80 feet of rope which hung from the top of the chimney, about 500 feet below the summit, and which will be useful to anyone who attempts the peak within the next few years, I consoled Edward to whom it belonged by promising him a new one.* We had, of course, a second rope with us; fortunately so; for Mr. Earle's, of which we again made use for roping off lower down, became eventually too frayed to trust the last man on it; its strands having become almost completely worn through.

The last remaining difficulty was to get down through the chimney where our real labors had commenced. It is an awkward bit, owing to one's feet being apt to get caught in some narrow rock-seams, and the absence of good hand grips. One has to trust almost altogether to the rope. It was 5.30 p.m. by the time that all the party has reached the spot (directly underneath this crack) where we had left our rucksacks and our ice-axes. Here a halt of three quarters of an hour was made for rest and refreshment; but one of the party was not hungry owing to the parched condition of his throat, there being no water available and other liquids, of which the supply was very limited, having already given out.

* In the A. C. C. Journal for 1908, p. 319, it is stated with reference to Mr. Earle's party: "Greatly disappointed, the party was compelled to retreat and descended to the gap, leaving 80 ft. of Buckingham's best rope hanging from the chimney for the benefit of the next party." It was, of course, not at this chimney that Mr. Earle's rope was hanging, but at the less difficult (second) crack lower down, and being doubled, it hung about 35 ft. in length.

By 6.30 p.m. we were again in the gap whence we had proposed making a rapid descent from its western exit, to the snow field stretching between both peaks of Douglas. This would have been a shorter way to our new camp. An inspection, however, showed that the first part of the route was both too icy and steep to make the attempt worth while. It would undoubtedly have been troublesome and entailed considerable step-cutting, the thought of which after an arduous day, and at this hour, was not to be entertained. The alternative was to retrace part of our morning route.

On leaving the gap and reaching the snow on the south side of the tower, it was found to be wet and inclined to slide off the solid ice which underlay it. It was therefore necessary to descend rather carefully and slowly in backward fashion almost the whole way to the névé basin, from which we had to climb up the short but steep slope leading to the col of Mt. Adrian. This was reached a little after 7.30 p.m. From this point at which we left our morning route, the going was relatively simple, so that fairly rapid time could be made over snowfield and glacier, on which no special difficulties were encountered, and by 9.15 p.m. we were in camp. Our men were not wholly convinced that evening that we had actually made the ascent; having shared in the generally popular view of Lake Louise that our expedition partook of the nature of a forlorn enterprise.

One general element of danger to mountaineers in the Rockies, is, it may be remarked, almost altogether absent on Mt. Douglas: falling stones. Owing to the perpendicular character of its walls, all loose débris has fallen away from its sides. There are few places where it can lodge. Only at one place was the rock found to be quite untrustworthy or dangerously unsafe. Although, therefore, incomparably more difficult than any

other mountain I have attempted in the Rockies, it compares in this respect favorably, for instance, with either Deltaform or Hungabee, the climbing on which is marred by insecure holds and the unavoidable danger resulting from the frequent discharge of fusillades of stones.

ASCENT OF MOUNT QUADRA (10,350 FT.).

From last year's quarters of the comfortable camp of the A. C. C. in Consolation Valley, a party including the Rev. Alec Gordon of Lethbridge, Dr. F. C. Bell of Winnipeg, the writer, and the two Swiss guides, Edward Feuz, Jr., and Gottfried Feuz, started on July 27th to climb Mt. Quadra (or Quatuor) the glacier-clad and strikingly serrated peak on the south-east side of the valley.* After several days of unsettled and even stormy weather, a most favorable change had taken place, and we experienced one of the finest days for mountaineering of the whole season, both with respect to temperature and clearness of atmosphere.

We left camp at 4.55 a.m., and, skirting the left sides of the two Consolation lakes by a more or less well marked trail, reached the snow slope leading to Consolation Pass, the summit of which was gained without difficulty at 7.05 o'clock. Three weeks earlier when Edward Feuz and the writer traversed this pass they had been obliged to cut their way through a cornice at the top. About two hours going from the Pass (including twenty minutes stop for a second breakfast) over shale slopes and snow brought us

* In his excellent guide book to the Lake Louise District, Mr. W. D. Wilcox who gives a beautiful photograph of "Consolation Valley and Mt. Bident," evidently identifies Mt. Bident with Mt. Quadra. It is the latter (with its four truncated peaks) rather than the former (double peak), at the end of the valley, which dominates a scene than "combines every element of grandeur and beauty characteristic of the Canadian Rockies." Ibid p. 32.



Photo J. W. A. Hickson

MT. DOUGLAS (South tower) FROM THE SOUTH

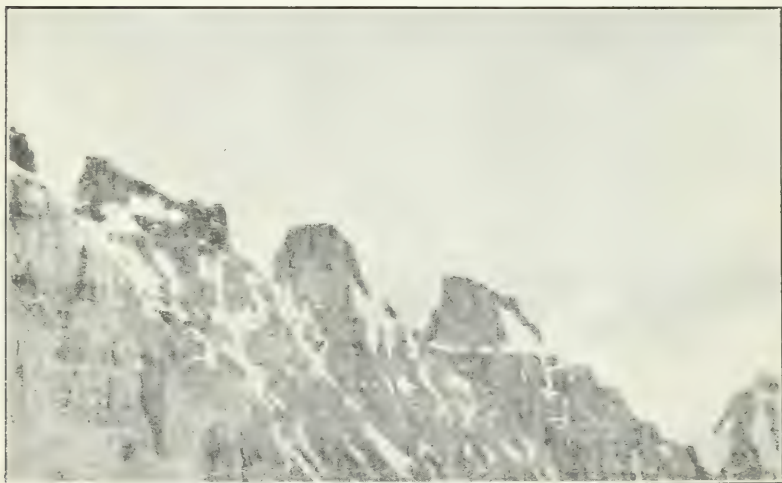


Photo E. Ford, J.

THE THREE LOWER TRUNCATED PEAKS OF MT. QUADRA.
Mt. Bident on right

around the south side of Mt. Bident, and across a fairly extensive snowfield, to the top col (about 9,500 feet) between our peak and an un-named lower one on the left, i.e., to the south. Here ropes were brought into use; the writer and Edward Feuz roping together and taking the lead, the remainder of the party following on a second rope. A short ascent over easy snow and loose boulders was followed by some pieces of interesting and quite sporting rock-climbing, up and down several chimneys and across sharp and jagged places in the final *arête*. Only one place was really difficult. A photograph of a characteristic bit at almost 10,000 ft. altitude is appended. It was mostly slow work, partly on account of the condition of the rock, which demanded extreme care, and partly owing to the size of the party. For although we were on two ropes, we kept together, both because it was more pleasant to have one another's company, and that the risk to the different climbers from dislodged stones might be minimized. The last 400 feet took us nearly 1½ hours. But time was no consideration under the perfect weather conditions.

The summit was reached at 11.10 a.m. (about 6¼ hours from camp); and was for the last hundred feet completely bare of snow. Its height was reckoned from barometrical measurement at 10,350 ft. It is undoubtedly higher than Mt. Bident and not much less than Mt. Fay. Notwithstanding rumors of a contrary nature, there were not the slightest traces of anybody having been there before; and the guides, who had tried to disquiet us during the climb, by discussing the probability of its not being a virgin peak, now claimed a first ascent.

After an hour spent on the summit, during which we revelled in the fine panorama (Hungabee especially looked very imposing), out of which we picked an in-

teresting-looking three-forked peak in the Spillimacheen district not known to any of the party, and generously refreshed ourselves and built a large cairn, we started off with the intention of traversing the three remaining and lower peaks. The first of these (the second in height) was fairly easy; the next following required more care and considerable time. A sharp descent over inferior and loose rocks led to some snow, which connected with the very steep and brittle rock-face of the third peak, (the second from the summit peak.) Fully an hour was consumed in its ascent, Mr. Gordon, Dr. Bell and G. Feuz now going ahead whilst we took up a safe position and waited until they were on top in order to escape the showers of stones which were unavoidably sent raining down. From the third peak a more serious difficulty confronted the party in attempting to reach the last and lowest one, which can undoubtedly be easily ascended from Mt. Bident. An absolutely precipitous descent necessitated roping off, which with a large party and only two ropes (not long ones) had to be carefully considered. What finally decided against it was an apparently well-founded doubt whether we might not get into an *impasse* between the third and fourth peaks. Perhaps, had the party been smaller, it might nevertheless have been tried; but, with five persons, even if it could have been successfully accomplished, it would probably have taken a good many hours.

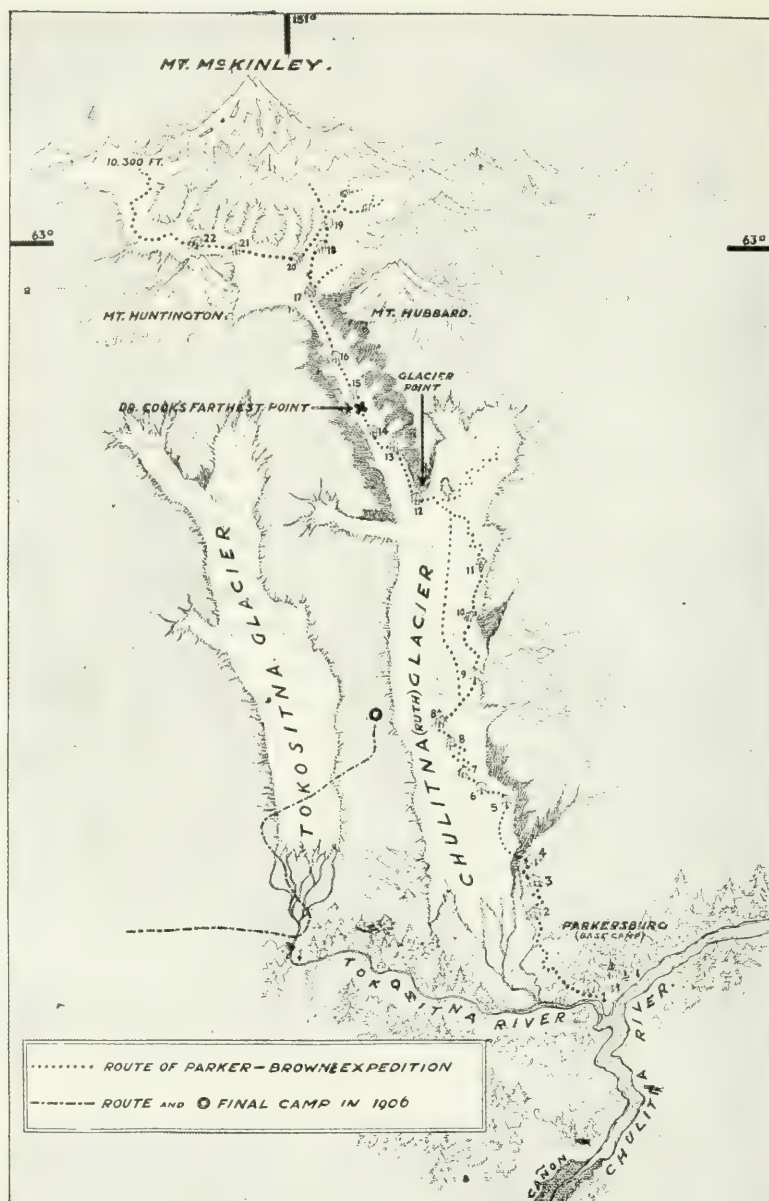
So at 2.45 p.m. we began to retrace our route, and by 4.10 o'clock had regained a point five minutes below the summit, passing which on our right, we got back to the *col* at 5.30 p.m. As the result of a brief deliberation, we made the mistake of deciding to return to camp by way of the snowfield leading to Mt. Fay, thence around this mountain to Fay Glacier and over a shoulder of Mt. Babel, instead of retracing the shorter and better

known morning route. None of the party realized at the time what we were in for; otherwise it would not have been attempted. It involved making a huge circuit. At first everything went well and at 7.10 p.m. we had crossed the snow between Mt. Little and Mt. Fay; and an hour and a quarter later had traversed and left Fay Glacier (rather badly crevassed lower down) for the shaly and rocky slopes of Mt. Babel. The disagreeable part of the expedition now began. Misled by what seemed to be a human trail, we kept too high up on Babel, whilst failing light forced us to reduce our speed at many points, which in daybreak would have been very simple. We got into places where we should never have been, and which in the darkness, where footholds and handholds are nearly wholly invisible, were very nasty. The going over the yielding shale, often uphill, was a wretched grind after being out for eighteen hours. It seemed interminable. As a matter of fact, we had a couple of hours of it.

A little after midnight, having worked around one of the shale-beds of Mt. Babel, we got a glimpse of Consolation Valley and the welcome sight of the camp fire; but, it being too dark to choose a route of descent, we crouched down under some cliffs and awaited the light which the rising moon soon afforded. By 1 a.m. we were able to proceed; and reached the camp an hour later, not too fatigued to enjoy a most varied and satisfying supper.

NOTE.—At the suggestion of Professor Fay, who thought that Miss Benham may have been on Mt. Quadra, I looked up the notes which she contributed to the *English Alpine Journal*, vol. 22, pp. 333, 334, relative to her ascents of Mts. Fay and Little, 1904. The "nameless peak" which she climbed by mistake instead of Mt. Fay (then Heejee), was perhaps the same nameless peak noticed by Mr. C. S. Thompson from Mt. Bident, *Alpine Journal*, vol. 22, p. 206. From Quadra we noticed two (as I think) nameless peaks, lying im-

mediately to the south; one of which was, I understood, climbed shortly after we did Quadra. Had Miss Benham climbed the present Mt. Quadra, she could hardly have seen Mt. Fay "lying far across the snow-field." For from her route of ascent between Nos. 3 and 4 of the Ten Peaks, Mt. Fay would lie nearer than Mt. Quadra; at all events, it would have been passed on the way. But apart from these considerations, there was not the slightest evidence of anyone ever having been on the summit of Quadra previous to our ascent.



ROUTE OF PARKER-BROWNE EXPEDITION

EXPEDITION TO MOUNT MCKINLEY.

BY HERSCHEL C. PARKER AND BELMORE BROWNE.

Mount McKinley, the highest peak on the North American continent and probably the greatest Arctic peak in the world, rising to an elevation of approximately 20,400 feet above sea level, and nearly 18,000 feet above the level of the perpetual ice, presents a geographical and mountaineering problem second only in difficulty if not in importance to the attainment of the summit of Mount Everest or the conquest of the South Pole. This peak has been known for several hundred years, first to the Indians under the name of *Traleika*, meaning the White Peak, and later to the Russians under the name of Mount *Bolshoy*, the Great Peak. It was, however, brought to the notice of Americans for the first time by Mr. W. A. Dickey, a graduate of Princeton, who while on a prospecting trip rafted down the Susitna river to within about forty miles of the mountain. He named it Mount McKinley, and estimated that its height was approximately 20,000 feet, the highest point on the North American continent.

Messrs. Brooks and Reyburn of the United States Geological Survey led an expedition in 1902 along the northern base of the mountain, with the object of making maps and surveys of that side of the range.

A year later Judge Wickersham of Alaska attempted to climb the mountain on the northern side, but attained an altitude of only 6000 feet.

A few months afterward, Dr. F. A. Cook, while on an exploring expedition around the mountain, at-

tempted to climb it and reached an altitude of probably about 10,000 feet on the northern side of the southwest ridge. The first attempt to climb the mountain from the southern side was made in 1906 by a party led by Dr. Cook, of which the writers were members. At that time the whole region south of Mount McKinley was unexplored territory, and the expedition was compelled to give up the attempt at a point twenty miles from the base of the mountain. Dr. Cook claimed to have made the ascent with his guide, Edward Barrill, after the expedition had abandoned all further attempt to climb the mountain, and his party was scattered in various sections south of Mount McKinley. With reference to this claim it is only necessary to give an outline of the facts discovered last summer by the present expedition.

Leaving our motor boat in almost the precise spot reached by Dr. Cook in 1906, about forty miles south of Mount McKinley, with a most perfectly equipped party, we found it impossible to accomplish in nearly sixty days what Dr. Cook had claimed to do in twelve days without practically any equipment whatever. We found the exact point photographed by him and designated the top of the continent twenty miles south east of the base of Mount McKinley, and it proved to be only a small rock about 200 feet above the ice, although the level of the glacier at this point was about 5000 feet above the sea. Many other points photographed by Dr. Cook were identified, and duplicate photographs made, and it was found that the nearest point reached by him to the base of Mount McKinley was approximately fifteen miles.

In the spring of 1910 several prospectors of Fairbanks, Alaska, led by Thomas Lloyd, made an expedition by means of sledges and dogs to the north-east ridge of the mountain, and although the published ac-

count furnishes no satisfactory geographical information concerning the work of their expedition, it seems probable that several members of the party reached one of the north-east summits and built a small stone monument at that point. This monument we hope to locate on a future expedition.

Our party consisted of eight men: J. H. Cuntz, of Stevens Institute; Waldemar Grassi, of New York; Herman L. Tucker, of the United States Forestry Service; Merl LaVoy and J. W. Thompson, of Seattle; Arthur Aten, of Valdez; and the writers.

Although it was probably one of the best equipped expeditions from a mountaineering standpoint that has ever been organized in America, the net result of its explorations is a map of a hitherto unknown stretch of mountain wilderness and the knowledge that Mount McKinley is unclimbable from the south. We attacked the mountain from no fewer than five different points, and in each case were stopped by unsurmountable difficulties. First, we approached from the south-east, and, establishing Camp No. 19 as our base, we made four unsuccessful attempts. Then, turning to the south-west as a last chance, we camped within two miles of the base of the southern cliffs of Mount McKinley, and finally reached an altitude of 10,300 feet on the south-west ridge. We were on the ice fifty days. Mountaineering technicalities had nothing to do with our failure to reach the summit; at each attempt we encountered straight walls of ice and snow and crevasses and bergschrunds that could not be bridged or avoided.

The problem of climbing the mountain from its southern side is an unusual one—a combined water, Arctic, and Alpine proposition. To reach the southern base of the mountain, the explorer must navigate, for 150 miles, a stretch of swift glacial water. The second part of the trip is through alternate stretches of forest

and swamp land which lie at the base of the Alaskan range; the last stage is over 40 miles of glacier that stretches from the lowlands to the base of Mount McKinley itself.

For the first part of our journey we took with us a 40 foot boat drawing 18 inches and driven by a 21 horse-power oil engine; for the rest of the way there was nothing for us to do but walk. As we were forced to use alcohol for fuel, our food rations were limited to pemmican, hardtack, erbswurst, sugar and tea. For shelter we used single pole tents, remodelled for our purposes, from an Arctic tent recommended by Anthony Fiala; the regulation ice axes, rope, and ice creepers completed our equipment. For the scientific work of the expedition, we carried topographical instruments, aneroids, recording barometers, thermometers and hypsometers.

We arrived at Beluga, a small settlement on Cook's Inlet, on the twentieth of May, and waited seven days for the ice in the Susitna River to break. The voyage from Seldovia, where we had left the steamer Portland, was uneventful, except that a rough sea gave us a chance to get acquainted with our launch, which was named the Explorer, after the Explorers Club of New York. She behaved well, although she was being towed, and showed that she would be of value on the rough waters of Cook's Inlet as well as on the swift rivers in the interior. We waited at Beluga until the ice in the Beluga river broke, and then ascended the Susitna river to Susitna Station, arriving there on May 25. The river was full of floating ice, and, fearing that some ice jams still remained to block our way, we stopped for a day.

Leaving Susitna Station on the evening of May 26, we settled down to the really serious work of ascending the Susitna. Our boat had not yet "found

herself", but we had power enough to navigate the swift water and arrived at Talkeetna—the last settlement on the river—on May 28, or twelve hours earlier than had been prophesied by men who knew the river. Here we heard that another expedition was in the field and had begun the ascent of the Chulitna river a few hours before. This expedition had been organized at Portland by Mr. C. E. Rusk, and represented the Mazama Mountaineering Club. We lost no time at Talkeetna. After caching some supplies, we said good-bye to civilization, and three hours later encamped on a sandy bar in the Chulitna river delta.

Our troubles began the moment we started up the swift, shallow waters of the Chulitna, but they were troubles for which we had prepared. We were forced to replace a smashed propeller blade on the second day, and as the water was extremely swift and shallow, we built a cache and lightened the boat by leaving everything behind that was not absolutely essential to our progress. We passed the Maxama party on May 29, but did not see them, as they were following a different channel. Our boat, equipped with a new propeller, seemed to fly through the water and our minds were at rest as far as river navigation was concerned.

We had been told that the Chulitna canyon would be too much for our boat, but the way she plowed steadily upward, between the rock walls and in the heaviest currents, justified our faith in her. This part of the trip was really enjoyable; we had no shallow water to contend with, and running the swift chutes was great sport. Through breaks in the sides of the canyon came the cool "smell" of the mountain snow, and later, when the clouds lifted, we could see the dark blue buttresses of the Alaskan range. On the third day we left the Chulitna and turned the Explorer's bow up the rushing waters of the Tokositna; about

two miles from its mouth we established our base camp, and named it "Parkersburg". It was here that Dokkin, the prospector who accompanied Dr. Cook, had wintered after the doctor left him in 1906. We used the little cabin which Dokkin built as storehouse for our supplies.

On June 2 our real work began. We split into several parties and prospected for a suitable route to Ruth Glacier, which we expected to follow to Mount McKinley. We then "brushed out" the best trail and began relaying our mountain supplies to the base of the great ice wall. Our course led through typical Alaskan bottom-land; thick spruce and birch forest dotted with bogs or "moose pastures", and the whole cut through by plunging ice-cold streams that fell from the glaciers and snow fields above us. Since leaving Beluga, we had been keeping pace with the vanishing snow; but in the shadow of the Alaskan range it was still winter, and we were forced to resort to our long Susitna snow-shoes before reaching the glacier. Back packing on snow-shoes is hard work, but the snow below timber line was really an advantage, for it covered the dense thickets of alder and willow.

On June 11 we had our last wood fire. We had packed 1200 pounds of mountain equipment on the back of the glacier, and from thereon we travelled through Arctic surroundings. The conditions were the same as those that prevail on the lowlands in the early spring when travelling is attempted only in extreme cases. During the day the snow turned to wet slush that clung to our snow-shoes until they dragged like leaden weights. Our packs averaged 70 pounds at first, although we carried more as our muscles hardened. The glacier was rough and cut up into innumerable hollows, lakes and sharp ridges, and under either the blazing sun or the weird blue light of the Northern

light the contours blended into flat masses. All of us suffered from snow blindness at one time or another, and striking a good trail under such conditions was largely a matter of chance. We were comforted somewhat, however, by the knowledge that the going would be better when we reached the hard-packed mountain snow, and a glimpse now and then of Mount McKinley, as it shook off its mantle of clouds and towered, clear cut against the Northern sky, was a stimulus to us.

During the long Northern dawn or twilight the snow fields were an ever-changing field of color beautifully subdued. We passed glacier lakes—golden bronzes, shading to emerald greens—lying in fields of rose-colored snow; or pools of deep sea blue in the living ice that reflected the first pink flush of the rising sun on distant snow peaks.

At our eighth camp, about fifteen miles from the starting point, we were abreast of the last camp that we had made with Dr. Cook in 1906. While there was a long stretch of the glacier behind us we had not advanced as rapidly as we had expected. Finding the glacier ahead badly broken, we knew the time had arrived to send out a reconnaissance party. We, therefore, sent Grassi, LaVoy and Aten to the base camp, with instructions to cook and dry as many beans as could be spared, and to bring extra bacon and flour. They were gone eighteen days, and it was on their return journey that LaVoy nearly lost his life by falling into a crevasse.

On June 22, after eleven days of continuous back-packing, we reached our twelfth camp, a point 10 miles nearer to Mount McKinley than we had reached with Dr. Cook in 1906. Here a huge wedge-shaped mountain cuts the glacier in two, sweeping down sharp as a knife from the main ranges and hacked

into deep saw tooth-like gaps, that break off into glacier festooned precipices. We were greatly interested in this mountain, for we had seen it, end on, from our last camp in 1906, and because it was the site of Dr. Cook's main camp on the march which he claimed ended on the summit of Mount McKinley. The first discovery we made on reaching Glacier Point, as Barrill had named it, was that the eastern tributary glacier is the same alphitheatre that is shown in the picture opposite page 197 of Dr. Cook's book. By locating this glacier we found the clue that enabled us to trace Dr. Cook's movements and to duplicate the photograph that he claims to have made on top of Mount McKinley.

On June 29 we entered the great gorge of the Ruth Glacier, to the west of Glacier Point, and began our final march on Mount McKinley. We had at this time a forty days' supply of food, consisting of pemmican, tea, sugar, and erbswurst, and an ample supply of alcohol for fuel. As we climbed up this great ice-filled canyon we had an excellent view of some of the most beautiful mountains we had ever seen; in places the smooth granite walls rose sheer to a height of 2500 feet above the snowy floor. It took us four days to relay our provisions through the gorge, and the last half of the journey carried us through unexplored country. Dr. Cook and Barrill had barely penetrated this wonderland, for they did not go much more than four miles up the canyon. The last of our relays through the gorge were made in a dense fog, and up to the time we pitched our seventeenth camp we were ignorant as to what lay before us.

Dr. Cook had said that Ruth Glacier headed into a great glacial amphitheatre, then moved in an easterly direction past the southern face of Mount McKinley, and then swung in a southerly direction to the Tokositna river. From what we had seen in 1906, we were also



Photo H. C. Parker

MT. MCKINLEY FROM THE SOUTH



Photo H. C. Parker

MT. MCKINLEY FROM THE EAST

of this opinion, but when we stepped from our tents on the first morning at camp 17, a great surprise was in store for us. Instead of seeing a continuous Alpine glacier, we gazed across a great Piedmont glacier, fed by innumerable ice rivers, which entered it through deep canyons in the surrounding ranges, and directly across this great basin, so near at hand that it fairly took our breath away, rose Mount McKinley.

Two of the north-eastern glaciers were of great size, and the séracs where they fell to the main glacier were 2000 feet high. Above these the glaciers sloped to a high col, or saddle, to the east of Mount McKinley's eastern ridge. This was the ridge we hoped to follow in reaching the summit, so we immediately made up a reconnaissance party to explore the two glaciers.

This work was not only arduous but extremely dangerous. We were confronted by an ice wall, about 2 miles wide and 2000 feet high. This great sérac was terraced broken and crevassed into inconceivable roughness. We had never seen ice of such treacherous rottenness; you could plant an ice-axe to the head in what appeared to be blocks of solid ice, yet in making traverses under the great walls, the glacial drift lay in such broken masses that we literally had to hew pathways through the frozen débris. During the day the face of the sérac was a veritable death-trap.

Sometimes as we plodded along we would become conscious of a distant whisper, almost a sighing sound, that came from the high peaks; the noise would increase gradually until it resembled the growl of distant surf, and then, gathering strength, it would remind one of the pulsating roar of artillery, or of peals of thunder rolling among the cliffs. Then, almost imperceptibly, the echoes still warring among the crags, the sounds would cease. At the first warning, we would brace ourselves, and as the roaring increased

some one would cry, "There it is!" and, following, his eyes, we would see a great film breaking through the clouds and dashing into spray on the cliffs below. We eventually grew accustomed to these wonderful sights, and as some distant avalanche started the echoes among the mountains, one of the men turning over in his sleeping bag would say "There goes the Limited Express."

Needless to say, we did our climbing at night when the walls were frozen into partial hardness. These climbs were more like weird dreams than reality. As the sérac was always moving, the danger of avalanches was great, even at night, and our work was done in silence and with the greatest caution. We were caught once on the great ice walls, as the sun began to weaken the frost. Tiny particles of the cliff above began to slither down all about us, and these in turn started miniature avalanches that disappeared into space over the narrow shelf which furnished us a footing. We were a happy party when we at last reached the glacier below.

One night when we were held in an ice couloir, or gorge, by a dense fog, an avalanche started in the mist high above us. We could see nothing, and the roar grew louder and louder, like the sound of a fast approaching train. We were decidedly uncomfortable until it swept into an ice gully beyond us, and we could hear the ice blocks crashing and breaking on the snow fields far below.

After four attempts to reach the top of the sérac we retired beaten. During this work on the sérac we underwent more actual climbing danger than we would have encountered in climbing several difficult peaks, and yet we accomplished nothing. Two of the party reached the top of the sérac on our last attempt by following the bottom of a crevasse, but ice walls



Photo H. C. Parker

"COOK'S PEAK"
20 miles SE. of Mt. McKinley

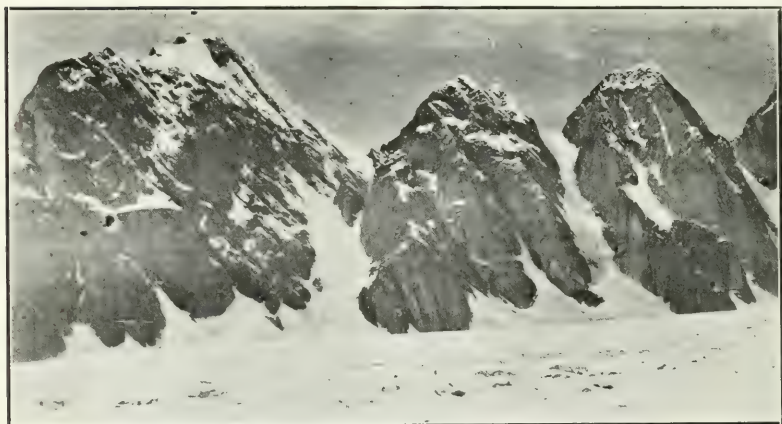


Photo H. C. Parker

FIRST THREE OF SEVEN GREAT ROCK PEAKS
South of Mt. McKinley

kept them from making the last few intervening feet to the smooth snow. Even if we had been successful, the route would have been impossible for packing purposes. During these days of reconnaissance work, our supporting party had been relaying provisions forward to a commanding point in the centre of the basin, so that in case we succeeded in finding a route to the East Ridge our outfit would be ready for an immediate advance.

Mr. Cuntz devoted himself to topographical work. After the supporting party had laid the final food depot, they explored a large glacier that came directly from the southern cliffs of Mount McKinley, but found the route impossible, because of the number of huge bergschrunds and crevasses that cut the surface of the glacier. All the *arêtes* leading to the southern cliffs of McKinley are absolutely unclimable. This is due in part to the snow conditions which differ from those prevailing on other well-known mountain ranges, in that the season being so short there is little or no melting on the higher peaks, and they are covered with tons of soft snow that hang ready to fall at the least disturbance. At least six glaciers head directly below the southern precipices of Mount McKinley and they all head in mighty "box canyons". It is safe to say that none of these canyon walls is less than 3000 feet in height. These glaciers were studied by us after our failure on the great *séracs*, for we traversed the whole southern face of the big mountain in an effort at least to reach its walls. This we were unable to do until we reached the great South Ridge, which shut off our route to the westward and prevented us from reaching the western side of our big mountain.

Before our attempt on the South Ridge, we ascended a noble ice pinnacle that would have been

a worthy prize for any mountaineer but for the fact that McKinley's giant cliffs made it appear much smaller than it really was. This peak gave us an interesting climb, the last 600 feet of the ascent being over a slope of hard ice. From the top of this peak we enjoyed what probably was the grandest and most complete view of the Alaskan range ever seen by man. During the whole climb which began at 10.30 p.m., every detail of Mount McKinley's great bulk lay before us. We reached an altitude that lowered the intervening peaks, and as the stupendous mountain range began to catch the pink of the distant sun we could scarcely keep our eyes away long enough to chop a step. From the top of our peak, we could also look across the cols above the great séracs where we had failed, and from their positions relative to the great Eastern Ridge, we are convinced that if we had succeeded in reaching the cols we would have encountered another great glacial hollow similar to the one we were in; as the cols rise to an altitude of at least 12,000 feet, we could see nothing of the lower slopes of the great ridge beyond. This only we know: The Eastern Ridge above 12,000 feet has no insurmountable difficulties to offer a well equipped party, but whether one can reach that altitude on the Eastern Ridge, and, if so, what route must be taken through the surrounding fastness to reach the base of the ridge, are questions that no one can answer as yet. The ascent of this peak, which offered all the difficulties of the highest and most difficult peaks of the temperate zones, although reaching an altitude of only about 9,000 feet, will give the reader an illustration of the mountaineering difficulties under which we labored in this almost Arctic mountain wilderness

The Alaskan Range is so close to the Arctic Circle, and rises from so low a base, that the difficulties of

reaching an altitude of 10,000 feet are as great as would be encountered, for instance, in the Himalaya in attaining an altitude of 20,000 feet. It took us thirty-four days of continuous toil, during which period we never once set foot on earth or gravel, but straggled ceaselessly over glacial snows and ice to reach our base camp at an altitude of 5,000 feet.

On the western side of the great amphitheatre we were in a glacier entered through towering cliffs. Our reconnaissance party had made a partial exploration of this glacier and had reported that its head lay under the end of the great South Ridge. This, therefor, was the only route left to us, so we laid a base camp in the centre of the amphitheatre against our return and began our long journey. Our advance along the ice floor of the glacier began at night, and morning found us within a day's travel of the South Ridge. As there were several glaciers which were new to us and which came from the cliffs of McKinley, we established a second base at the foot of a great cliff and began our final reconnaissance.

From the main glacier we could see that the three feeding glaciers from Mount McKinley were short and they also headed in stupendous box canyons. One head wall in particular rose sheer for at least 5,000 feet, and as we stood examining it a mountain of snow broke loose from Mount McKinley and thundered downward to the glacier bed. The great cliffs, under the thousands of tons of dry snow, smoked as if on fire, and a great wall of powdered ice rising solidly and rolling across the mile of snow between us engulfed us in swirling frozen mist. After crossing two good sized séracs and many large crevasses—into one of which Tucker fell and was saved by the rope—we reached a large snow basin just below the South Ridge.

The lowest saddle in the South Ridge hung just above us, but it was hopelessly corniced, and below the death trap swept gaping blue wounds, where the snow slopes had sagged into bergschrunds. To the right and left of the basin rose cliffs fringed with séracs and tons of icicles, but the sound of the falling débris was warning enough. It was hopeless, but we wanted to put some of McKinley's snow beneath our feet, so we took the most open snow slope and climbed until a bergschrund stopped us. Below we had boiled our hypsometer, having first chopped a hole in the ice in which to shelter the flame from the wind. We turned back at 10,300 feet. McKinley had beaten us again, but, figuratively speaking, we patted the big mountain on the back, and turned to get what comfort we could from the splendours about us.

Any mountain view is beautiful when it lies spread at your feet, but when the great peaks and valleys and glaciers are new and filled with the grim suggestion of savagery and mystery that only the unexplored wilderness possesses you are dumb with awe and reverence and thankfulness for having been allowed to see such beauty. As we turned back the knife-like ridges above us were smoking under a forty mile gale, and long, white snow streamers from the upper snow fields drifted across the blue sky

As we swung down into the chaos of lower peaks which we had struggled through, and realized that we were at the beginning of the "home trail," we were filled with sadness at the thought of giving it all up. We all felt that the grim peaks and canyons were a part of us; we had lifted the cloak of mystery from their broad snow-covered shoulders; we had awakened them from their sleep of unknown centuries with the strokes of our puny ice axes, and were taking their measurements and photographs to the outside world.

We left the glacier on the evening of August 1, after fording a swift ice-cold stream that swept the foot of the great ice wall, and camped among the willows on the farther bank. Behind us the great ice river arose grim and lonely against the night sky. Looking back over the great walls of ice was, as one of the men said, "Like looking back on a mis-spent life," so we turned gladly to the warmth of our camp-fire and thoughts of the food awaiting us on the Chulitna.

At our base camp we heard that the Mazama expedition had already left for home. They had been forced to give up their attempt on account of not having enough food. Rusk, the leader of the expedition, reached our base camp in the big amphitheatre below McKinley and then returned after a short visit. We spent a few days at Parkersburg, completing our topographical work on August 3, and then after a long look at our old camp, we started the Explorer's engines and swung into the rushing waters that led to civilization.

Mount McKinley presents unique difficulties in mountaineering and exploration. The location of this mountain in one of the most inaccessible regions in the world, in addition to the intrinsic difficulty of the mountain itself makes it a most difficult problem. The expeditions in 1903, 1906 and 1910 prove that it is useless either to attempt to climb the mountain from the southern side, or starting from the southern side to cross to the northern side by means of a pack train or motor boat and back-packing, as the point where the range may be crossed by this means, and the time taken to accomplish it, render it out of the question to reach the summit of the mountain the same season.

A possible solution appears to be to start from the southern coast in winter, and by means of dogs and sledges to cross the Alaskan range at the nearest pos-

sible point to the east of Mount McKinley, and so gain the north-eastern ridge with ample supplies and equipment by the end of March. The attempt to reach the summit could then be made during April or May. This plan, the writers expect, to follow next winter, leaving the Alaskan coast in February. Should the trip prove successful, it might be possible to get out of Fairbanks by means of sledges before the snow in the lower valleys had disappeared. Otherwise, it will probably be necessary to descend the Kantishna river by means of a raft and so reach the Tanna, where a steamer could be taken to either Fairbanks or Dawson.



Photo Ivor N. Austin

MT. BABEL AT ENTRANCE TO VALLEY OF THE TEN PEAKS



Photo Byron Harmon

MTS. BABEL, FAY AND PEAK 3, SHOWING ROUTE TAKEN UP FAY GLACIER AND
ridge of Mt. Babel

MT. BABEL AND CHIMNEY PEAK.

BY E. O. WHEELER.

FIRST ASCENT OF MT. BABEL.

In the spring of 1910, at Port Hope, Ontario, Mr. H. H. Worsfold and myself decided that if it could be managed we should have a try for Mt. Babel at the A. C. C. camp that summer. The mountain is, I think, slightly over 10,000 feet, and looks a very fine peak from the Moraine lake driving road, though from the other side it appears more as a series of short cliffs broken by scree slopes rising from the Fay Glacier.

On Tuesday night we had arranged everything for an attempt on the peak the following day, and accordingly at 5.40 a.m. on Wednesday, July 20th, a party, consisting of Messrs, H. H. Worsfold, A. R. Hart, L. C. Wilson, and the writer, left Consolation Camp and struck off down the trail to Moraine lake. Reaching the lake, we followed along the foot of the line of cliffs on its eastern side, gradually gaining height, and circling around Mt. Babel until we reached the moraine at the foot of the Fay Glacier, which we ascended on the left hand side, close under Mt. Babel, until almost beneath the steep crevassed icefall, where we took to the rocks (7.25 a.m.). The weather was perfect and the snow in excellent condition; though the sun promised to be hot later in the day and we looked forward to a fine view from the summit.

I had been up to the *col* between Babel and Fay earlier in the season and consequently steered for a small chimney between the rocks and the ice, by means of which a rather steep bit of cliff could be avoided; however, on reaching it, after about an hour's rough

scrambling and scratching up a gully and over rotten ledges, we found that this chimney was impracticable owing to the ice having melted away from the only spot which gave any holds. We then had a try straight up the glacier, but soon gave it up, and started back around the base of the cliff to look for a possible route. At last we saw one that seemed feasible, and again began to ascend. It was comparatively easy until we came to the final 15 feet which overhung slightly, but which fortunately were of rough and solid rock. By means of a lusty hoist from Wilson and Worsfold, I was soon up, and at 11.00 a.m. we stood on the edge of the glacier. From there to the *col* (which was reached at 12.05), was plain sailing, although the *séracs* seemed ready to drop on us at any minute and the tramp up the last bit of snow was hot and tiring.

The *col* is rather narrow, and looks almost vertically into Consolation valley, the camp, however, being hidden by a buttress of Babel. As far as we could see, the mountain looked fairly easy, what we took to be the summit being about 1000 feet above us, and behind a rather steep hump which perhaps might be a difficulty. We left the *col* at 12.30 after a bit of lunch and followed up the ridge to the hump, which we easily avoided by a traverse to the left, a steep and rotten gully bringing us to the ridge again. In another ten minutes we stood upon the summit (1.15 p.m.) and looked down upon the camp, the tents appearing like so many white specks among the trees, nearly 3,500 feet below us. The view to the north and east was glorious, Assiniboine showing up in the far distance, but to the south and west everything was shut out by the high peaks on the continental divide.

After building a stoneman and enjoying three quarters of an hour's bask in the sun, we descended

rapidly to the *col* and started on a hot tramp across the Fay snowfield to the pass between Mts. Fay and Little, reaching the latter at 2.50 p.m. This pass seemed hopeless on the south side, so we had to go around Mt. Little to the pass between that mountain and number 3 of the Ten Peaks, thus crossing the divide into British Columbia (3.30 p.m.). From there we traversed the big snow basin at the back of Mts. Little and Fay, and climbed up the steep snow and scree slopes to the "Middle Pass" (that between Mt. Quadra and an unnamed peak to the south) at a height of about 9,600 feet. The sun was terribly hot and our faces suffered, but oddly enough the snow was hard, and we made good time; reaching the pass at 5.10 p.m. and recrossing the divide into Alberta.

After a fifteen minute halt, during which we ate up the remains of lunch, we started down, and crossing the small glacier at the head of the Boom Lake Valley, got on the south slopes of Mt. Bident where we were glad to discard the rope after having it on continuously for nearly eleven hours. We crossed Consolation Pass at 7.25, and, after the usual snow plod and glissade, reached camp at 8.45, all very tired and extremely hungry, but much pleased with the day's work. We had been out for just fifteen hours and had gone completely around Mt. Babel, Fay Little, Quadra and Bident, besides ascending Mt. Babel.

FIRST ASCENT OF CHIMNEY PEAK.

During the whole of the A. C. C. camp I had been looking longingly at a little peak of about 10,000 feet, so far unclimbed, which is situated just west of the great divide, and is the second summit south of the "Middle Pass." It seemed as though this mountain could be reached from Consolation Camp, across the Boom Glacier, and it appeared from a distance to be

a nice climb, besides being a virgin ascent. As I had a day free at the end of the camp, I tried to make up a party for an attempt, and, Dr. Tom G. Longstaff agreeing to come along, we made all the preparations for an early start the next day, Saturday, July 30th.

On turning out of bed at 3.00 a.m., the weather looked so doubtful that we decided to give up the climb; however, at 4.30 it was considerably better, though a trifle too warm, and, dressing hurriedly, we managed to get away by 5.35. As the snow was in excellent condition, we crossed Consolation Pass to the west of its lowest point and continued on around the north-east shoulder of Mt. Bident to the moraine on the Boom Glacier, where we roped at 9.10 a.m., and studied out the most likely way up the mountain. From there to the *col* between our peak and the one just south of the "Middle Pass" our route lay up snow slopes of varying steepness and increasing softness, with a short change to loose rock near the top.

Arriving at the *col*, we saw that there was a line of cliffs between us and the peak. To reach the summit we might do one of three things: traverse out on the snow to the left (north-east), go straight up a chimney in front of us, or perhaps, by going around to the right, get up the cliffs on the Prospector's valley side of the mountain, which we could not see from the *col*. The first way was not good; the snow was very steep and apparently resting on ice, besides steadily becoming more slushy under the hot, morning sun. By going up the snow ridge shown on the accompanying illustration and traversing across to the ledge just below the cliffs, it soon became evident that the last route was impossible, leaving the chimney as the only practicable way.

At eleven o'clock, after a few minutes' rest and a bit of chocolate, we started up. The first 15 or 20



Photo T. G. Lonsistiff
CHINMEY PEAK FROM COL SHOWING
THE ROUTE TAKEN

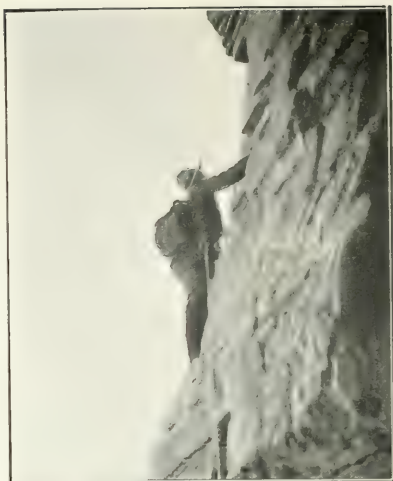


Photo T. G. Lonsistiff
THE WRITER JUST ABOVE THE
"SLAB"



Photo Byron Harmon

CHIMNEY PEAK FROM BOOM GLACIER

feet were comparatively easy though slippery, and at that point there was an excellent stand in the chimney with a projecting rock behind to which Longstaff tied himself, as I happened to be in the lead at the time. We were still from 40 to 45 feet below the top of the cliff, and as the upper part of the chimney seemed to be rotten, besides overhanging considerably, I traversed horizontally to my left along a narrow ledge to examine the steep slab which was the alternative to the chimney itself. This slab was broader than I had thought at first, and involved a long stretch with the legs at the same time swinging the body slightly to the left with the hands, but with care this can be safely accomplished. For the next 10 feet or so the rocks were steep and the holds small though firm; from there on the ledges became broader and the top of the chimney was reached without a mishap at 11.45. Safely up, we turned sharply to the right, and after a short scramble up a gully reached the north *arête* of the mountain which we followed to the summit, arriving there exactly at noon.

We remained on top nearly an hour eating a well-earned lunch and enjoying the view which was magnificent to the east, south and west. We could see well up to the head of Prospector's and Misko Creek valleys and had a fine look at Goodsir across the Otter-tail. At 1.00 p.m., after building a stone man and christening the mountain "Chimney Peak," in honor of our little chimney, we began the descent. When we came to the top of the cliff again, as neither of us was keen to go down last and seeing a nice projecting buttress handy, Longstaff suggested "roping off." I agreed heartily, remarking that it would be quite a new experience for me. I then came down on the rope by the same route we used on the way up, and getting into the chimney, tied myself carefully to the

rock and took a firm stand. Meanwhile, Longstaff had placed the rope over the buttress above, blocking up all the crevices with small stones so that it should not jam, and while I held on to my end of the rope he came down the other end to the ledge and so down to the foot of the cliff, leaving me to free the rope. This, however, I could not do, as it seemed to have jammed completely.

After several futile attempts, I moved out on the ledge and Longstaff came up again into the chimney. Between us, by dint of a great deal of shaking and pulling we succeeded in getting the rope loose, upon which he started pulling on my end, thus having to unrope himself to allow his end to go free. As it slipped slowly over the knob of rock he called out, "look out for stones," but none came; the whole rope then fell into the chimney, the end lying loosely against a rock as big as a man's head, about 15 feet above him. Longstaff, not thinking that this stone was so loose as to move with the slightest touch, pulled gently on the rope and, without any warning, down came the rock at his head. Being unroped, he was afraid to dodge for fear of falling out of the chimney, so put out his hand to protect his head and succeeded in warding off the stone, but in doing so broke the middle finger of his right hand in three places, besides cutting the hand badly.

He called out: "Get me down out of here quickly; I've broken my finger." At first I did not realize what he was saying, but seeing the rock bounding down the snow below I got to him as quickly as possible, and roping him up again let him down to the broad ledge at the foot of the cliff. Luckily we had some whiskey with us, and a strong dose made him feel better, though the finger must have been exceedingly painful. How he managed the right handed traverse

across the steep slope leading to the snow ridge is more than I can understand, for I could give him no help whatever with the rope, and he had to use his ice axe in his left hand, jamming his right elbow into the snow to steady himself; it was a tricky traverse even with both hands in commission. At the *col* again, we stopped to bandage the hand, and using the folding lantern for a splint, I bound it up as best as could under his direction.

The rest of the trip home by our route of the morning was made without further adventure, and taking only four breathing spells in the whole distance, we reached camp at 7.15 p.m.

MT. SUGARLOAF. A SOLITARY GLACIER CLIMB.

E. W. D. HOLWAY.

"There is society where none intrudes."

It was late in the fall of 1910 and the writers' companions had returned to their homes. The mountains, with their great stretches of crimson and gold foliage were more beautiful than ever, and it was delightful to linger at the Glacier House.

An occasional traveller was shown the way up Mt. Abbott or guided across the Asulkan glacier, the ascent of Mt. Sifton was made alone and then the desire for something new became very strong. After vainly trying to induce some one to go, a tent, sleeping bag, dishes and food were packed and the train taken to Bear Creek Station. Leaving there at noon, the heavy load was shouldered, the descent made to Beaver valley and the old trail followed. The first stop was on the bank of the river about opposite Sir Donald. The weather had been growing worse for several hours and by the time the tent was up and supper cooked the storm began. It was a wild night, the wind howling and the rain falling in torrents. Near by, two trees were rubbing together emitting weird and awesome noises. A timid person could easily have believed the lumberjack's story that these sounds are the cries of the "Hodag", an evil spirit lying in wait for unprotected wanderers. The writer, warm and dry in the down bag, the little silk tent defying the elements, felt a peculiar elation, a wild joy, a sense

of power and triumph, and slept as only the pack-carrier can.

About eight o'clock in the morning the rain ceased enough to allow of a fire and the journey south was soon resumed. The trail was thickly overgrown with willows and alders, a snow slide had piled up trees in every direction, everything was loaded with big drops of water so that all day long it was like wading a river. The last party known to have been in was Carson's survey and when opposite the Grand Glaciers his blazes were fortunately seen leading down the mountain-side to the river, and a short distance up his camp was found with plenty of dry wood. It was a fine place, but extremely cold. All night long the enormous ice-fields furnished a steady current of frigid air. Mr. Carson's inscription on a tree said it was twenty-four miles to Bear Creek and that there was a trail to the glaciers, so in the morning the river was waded and a search made for the trail which was finally found to be a few blazes on the trees. Higher up where he had cut a trail through the alders a big slide had come down so that it was climbing over and under a tangle of tree trunks.

The polished rocks below the ice were very hard and necessitated careful going, as the boot nails would not hold at all. The day was spent in exploring the Grand Glaciers which are well worthy of the name. The great ice-fall of the north branch coming down from the Deville Névè was furnishing frequent avalanches. The more level part between Sugarloaf and Grand Mt. is in great waves, different in many ways from any glacier in the region. Camp was reached late in the day, a pail of oatmeal cooked and placed in the tent and preparation made for an early start the next morning. On arising at 4 a.m. the breakfast was found frozen quite hard. At 5 a.m.

the river was again crossed, breaking through a little ice at the edge, and the distance to the tongue of the glacier rapidly covered. Then the route was to the south, over the rocks and lateral moraine for some distance, when the glacier was taken for a mile or more and then a turn made to the south and the steep ascent of the ice begun. It was so late in the season that the glacier was wonderfully crevassed. Much new snow had fallen in the big storm and the ends of even large crevasses were drifted over. As height was gained, the holes became of enormous size, requiring going right or left for long distances. Finally the ridge was reached and Mts. Duncan and Beaver appeared with the great Beaver Glacier descending into the valley far below. The route was then south-west along the *arête*, all snow except two small rocky peaks where a few stones showed through. Upon reaching the summit of the second one the "loaf" was seen and the reason for the name was apparent. This view cannot be had until near the summit. From here on it was over great drifts of new snow, partially crusted enough to hold but frequently breaking through. The "loaf" was ascended by the easy snow slope on the east and the summit was reached at 2 p.m. A very strong wind blew up the Beaver Glacier and the air was filled with fine snow so that it was scarcely possible to see; the cold was so severe that a hasty retreat was made to the first rocks where the sun shone brightly and it was warm enough to lunch and enjoy the magnificent view, which was particularly fine across the Deville and Illecillewaet Snowfields, with Sir Donald in the distance.

In descending, the same route was followed until well down the steep glacier when it was found that the sun had softened the new snow so that it easily slid off the ice beneath. So a sharp turn was made to the



Photo E. W. D. Holway

MTS. DUNCAN (left) AND BEAVER (right)

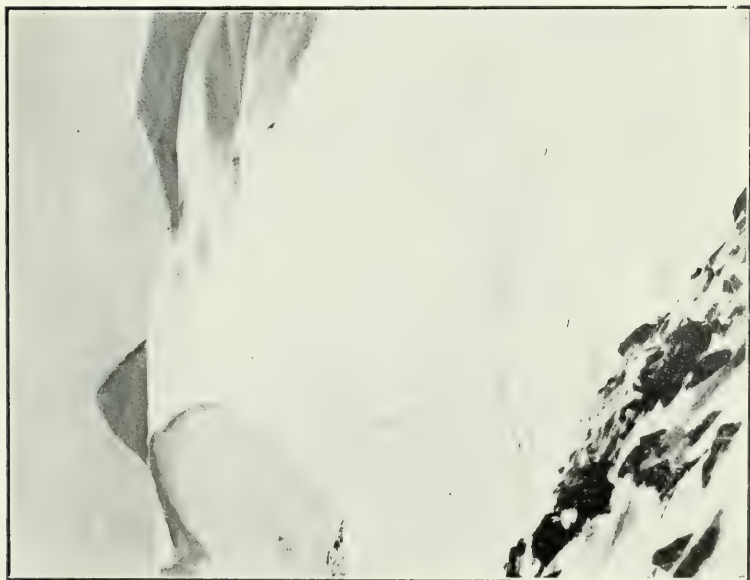


Photo E. W. D. Holway

THE "LOAF" OF MT. SUGARLOAF



Photo E. W. D. Holway

GRAND GLACIER (North Glacier) AND GRAND MOUNTAIN



Photo E. W. D. Holway

MT. DUNCAN AND BEAVER GLACIER

east, keeping at such a height that the snow was safe. It finally became necessary to cut many steps in order to get down to the more level glacier and rejoin the morning route. By running through the timber, camp was reached just before dark. The river was high at night and a careful use of the ice axe was necessary to keep right side up.

The next morning the ascent was made to the trail, which was followed four miles south to the Beaver Glacier and the day spent in exploring it. The tongue is very large and comes down into the valley. The next day, an early start was made and Bear Creek Station reached about 5 p.m., where the pack was checked to Glacier House. No train was available until the next day and when the intention was announced of walking, the agent's wife would not allow it until she had furnished a warm meal. The rest for two hours and the fresh eggs, hot biscuits, home-made preserves and tea were very acceptable.

It was dark when the start was made and in the numerous snowsheds nothing at all could be seen, but by dragging the ice-axe on the rail the center of the track was easily kept. Inquiry was made at the first section-house as to open culverts in the sheds and the men kindly offered sleeping quarters. When told that Glacier was the goal they almost compelled the acceptance of a lantern. Later in the long shed, a man was seen approaching with a light. "I am looking for you," he said, when near; "'the boys below telephoned me to watch for you.'" At about 10 p.m. Glacier House was reached and a hot bath removed all the kinks caused by the thirty-three miles walk.

Sugarloaf was first ascended in 1890 by Huber, Topham and Forster, and again in 1907 by Carson for survey purposes. The great drifts of recent snow on the summit made it impossible to find any monuments.

SCIENTIFIC SECTION.

MOUNTAIN SICKNESS AND ITS PROBABLE CAUSES.

BY T. G. LONGSTAFF.

EDITORIAL NOTE.—Dr. Longstaff has permitted the Journal to publish the following extracts from his Doctorial Thesis, entitled "Mountain Sickness and its Probable Causes." The thesis is a very valuable one to mountaineers, entailing a tremendous amount of research and hard work on the part of the writer, and it is regretted that limited space will not permit of its publication in full. It has been endeavoured to extract the parts of interest to the mountaineer rather than to the scientist. If undue omissions have occurred, apologies are due to Dr. Longstaff.

INTRODUCTION.

In the following pages I propose to approach the complex group of symptoms commonly known as mountain sickness from the point of view of the mountaineer. If an apology for so unscientific a method is needed, I can only plead that he is the person chiefly concerned and most often affected by these symptoms. By the term mountain sickness, I mean symptoms of illness or distress primarily produced by the ascent of mountains, whether due directly to reduced atmospheric pressure or to some other cause or causes.

Very much has been written on the subject. Quite recently Zuntz and his pupils have combined work in the laboratory with work of the highest scientific exactitude above the snow-line. But apart from these observations, it appears to me that most writers have

confined themselves too much to theories deduced from experiments in the laboratory and too little to the actual experiences of mountaineers engaged in high ascents. Therefore, before defining the disease or attempting to explain its etiology, I do not think I can do better than review the actual experiences of mountaineers at high altitudes. Such a review I present in Part I. In doing this, I must draw attention to a somewhat instructive fact. During the latter part of the eighteenth and the beginning of the nineteenth century, that great period of awakening interest and research into physical science, mountain ascents were encouraged and performed only by scientific men. Such men, practised observers, and expecting to be severely affected by what we now consider to be only moderate diminutions of atmospheric pressure, noted even the smallest abnormal symptoms in themselves, and also attributed the fatigues of unaccustomed exercise to this cause. On the other hand, during the last fifty years mountaineering has become a sport, and is practised by much larger and very different class, although it is true that many men of great scientific attainments are to be found in the ranks of modern mountaineers. Still, even these look on their favorite pastime rather as a sport than as a means of scientific investigation, and the modern mountaineer being usually an athletic person, is not at all likely to pay much attention to slight symptoms, much less to put down to mountain sickness the fatigues and discomforts of what is certainly the most severe form of exercise. So far has this gone that several first-rate mountaineers have been led to express their disbelief in any such disease, and have attributed all symptoms of illness during mountain ascents to a weak digestion, or lack of training and condition, or constitutional feebleness on the part of the sufferer.

The following abstracts (Part I.) are taken from the published accounts of all the highest mountaineering expeditions yet made, and have not been selected to suit my own views in any way. I have carefully retained the phraseology of each different witness, the wide divergencies in which form a not inconsiderable part of the difficulty in arriving at an exact appreciation of their symptoms—or the absence of them. Owing to the great differences of technical difficulty and weather conditions on different mountains, and even on the same mountain on different days, very little reliable evidence is to be obtained by referring to the length of time taken over a particular ascent; nevertheless, I have noted this whenever possible. All heights are given in feet, and the equivalent mean barometric pressure in inches Hg. The mean pressures corresponding to definite altitudes are taken from Airy's Tables. As the atmospheric pressure at any given spot varies considerably at short intervals, accuracy in the correspondence of pressure to altitude is impossible.

ALTITUDES AND EQUIVALENT BAROMETRIC PRESSURE.

TAKEN FROM AIRY'S TABLES.

Altitude in Feet.	Barometric Pressure.	
	in.	mm.
0 Sea-level.....	31.00	787
11,000. Equivalent $\frac{2}{3}$ atmosphere.....	20.70	525
14,000.	18.55	471
15,781. Mont Blanc	17.35	440
17,000.	16.61	422
19,000. Equivalent $\frac{1}{2}$ atmosphere.....	15.44	392
22,000.	13.83	351
23,000. Equivalent 7,000 metres.....	13.33	339
24,000. Kabru, highest mountain ascended...	12.85	326
27,000.	11.51	292
29,000. Mount Everest.....	10.70	272
30,000. Equivalent $\frac{1}{3}$ atmosphere...	10.31	263

PART I.

THE TESTIMONY OF MOUNTAINEERS.

THE SPANISH CONQUISTADORS: SIXTEENTH CENTURY.

The first great mountaineering exploit dates from A.D. 1519 when Cortes sent Diego Ordaz with nine Spaniards and several Tlascalans to attempt the ascent of Popocatepetl (17,500 ft.). Leaving classical fables aside, we here find the first reference to the effects of low pressure on the human economy. The Indians fled at a height of about 13,000 ft., but the Spaniards penetrated above the snow-line over what was for them very difficult ground, 'while to increase their distress respiration became so difficult that every effort was attended with sharp pains in the head and limbs, and they were compelled to turn back before reaching the summit. Two years later, Francisco Montano and four Spaniards reached the summit (17,500 ft.=16.3 in.), and obtained sulphur for the manufacturing of gunpowder from the crater. Perhaps the determined and resolute character of this cavalier may account for the fact that we find no reference to mountain-sickness on this occasion, though Cortes concludes his report to the Emperor with the reflection that it would be less inconvenient to import their powder from Spain.—(Prestcott's 'Conquest of Mexico,').

ATTEMPTS ON THE EARLY ASCENTS OF MONT BLANC:
LATTER HALF OF EIGHTEENTH CENTURY.

De Saussure describes his symptoms occurring between 10,000 and 14,000 ft. as 'faintness, accompanied generally by vomiting, indescribable uneasiness, anxiety, thirst, no appetite, tendency to sleep'. On his successful ascent he suffered from fatigue to an extreme degree, and notes that making observations on the summit was very slow and laborious work. But 'on the mere

cessation of movement one feels complete restoration of the strength'.—(Mathew's 'Mont Blanc').

HUMBOLDT IN THE ECUADOREAN ANDES, 1802.

Though by no means a skilful mountaineer, he easily established a record for altitude of about 18,500 ft. (=15.7 in.) during an attempt on Chimborazo. During the latter part of this ascent he complains of malaise, nausea, and giddiness, which was far more distressing than the difficulty of breathing. He also says that he and his companions suffered from bleeding of the lips and gums. He adds that all these phenomena vary very greatly in different individuals. (Bruhn's 'Life of Humboldt').

THE GERARDS IN THE HIMALAYA, 1817-18, 1821.

These travellers explored the Spiti-Tibet frontier, camping more than a dozen times at over 15,000 ft., in addition to making several high ascents. They note that 'depression of spirits bodily debility, fulness in the head, oppression at the breast, and difficulty of respiration, with now and then pains in the ears, affect everybody in greater or less degree' at high altitudes, but add a rider that these symptoms 'do not affect everybody equally, nor the same person at all times, depending in great measure on the state of health. . . . However, headaches were almost constant above 17,000 ft., and their rate of progress was greatly reduced over 14,000 ft.

HOOKE IN NEPAL, 1848-50.

Sir Joseph Hooker, though not a mountaineer, often visited heights of 18,000 ft. At heights of 17,500 ft. and over he always suffered from weakness and nausea, and his native followers from headache and giddiness. He had experienced similar sensations at lower altitudes in Africa and Europe.—(Hooker's 'Journal').

WHYMPER IN THE ECUADOREAN ANDES, 1879-1880.

In 'Travels Among the Great Andes of the Equator' (1892), we have one of the best and fullest descriptions of an acute attack of mountain sickness yet written by a mountaineer.

At his second camp on Chimborazo, 16,664 ft. (=16.8 in.) up to which the mules had been driven with the greatest difficulty, though the ground was easy, Whymper and the two Carrels (Italian Alpine guides) were utterly incapacitated, although they had ridden almost up to the camp. Very intense headache and very labored respiration even when lying down were the most marked features of this remarkably sudden attack, which was also accompanied by increased pulse rate and a slight rise of temperature (100.4°). The symptoms lasted all night and the next day, when they were somewhat relieved after taking 10 grs. of pot. chlorate, though Whymper admits that this might not have been the cause. In connection with this, Whymper quotes Bellew ('Kashmir and Kashgar') to the effect that pot. chlorate effectually relieved the nausea and headache from which the members of Forsyth's Yarkand Mission suffered so severely. It was strongly recommended to Whymper by the late Dr. Marcet, though with our present knowledge it appears to be rather an added source of danger than a possible source of relief.

Whymper's third companion, Perring, though of very unfeebled constitution, never suffered at all. Two of the party had already visited this spot without being affected.

Whymper's headache lasted till the third day, but the Italians got rid of theirs in 36 hours, and went ahead to reconnoitre. They ascended to 19,300 ft. (=15.25 in.), returning in 12 hours completely exhausted.

A couple of days later they moved to the Third Camp 17,285 ft (=16.45 in.). Meanwhile they seemed to have grown weaker, though headache had disappeared.

Ascending still further to 18,500 ft. (=15.7 in.) it was remarked that their pace was markedly slower than before, and this was still more marked on the day after, when they reached the summit of Chimborazo, 20,545 ft (=14.6 in.), though it is to be noted that they were greatly impeded and fatigued by the depth and softness of the snow.

Circumstances then compelled Whymper to leave the neighborhood of Chimborazo. But in the following month he remained close to the summit of Cotopaxi with the barometer at 15.0 to 14.75 in. (19,500 ft.) for 26 consecutive hours without any serious inconvenience.

Again, upon Antisana at 17,623 ft. (=16.2 in.) and Cayambe, 19,186 ft. (=15.2 in.), there was not even headache, merely a feeling of lassitude and want of bodily strength. The same absence of unpleasant symptoms, beyond some shortness of breath, was noted on the second ascent of Chimborazo, 20,545 ft (=14.6 in.).

In conclusion, he divides the effects of low pressure into two categories — transitory and permanent. The first are acceleration of the heart, rise of temperature, and increased pressure on the blood vessels. The second are increased rate and altered manner of respiration, indisposition to take food, and lessening of muscular power. At no time did they or any of the numerous natives they employed show any sign of haemorrhage or nausea.

He argues that the fact of his pulse rate and his temperature falling to the normal while living at a pressure of 16.85 in. 16,600 ft.)

shows that mountain sickness cannot be entirely due to want of oxygen, for if it were, these symptoms must persist. He very rightly objects to much stress being laid on the rate of the pulse, and points out how much better an indication is the manner and rate of respiration.

GRAHAM IN THE HIMALAYA, 1883.

Graham was a climber with a very high reputation for skill, speed, and endurance in the Alps, and he sustained this reputation in the Himalaya by ascending no less than nine times to heights of over 20,000 ft., including the ascent of Jubonu (21,300 ft.), Mount Monal (22,516 ft.=13.6 in.), Dunagiri to a height of 22,700 ft., and Karbru (24,000 ft.=12.85 in.), the latter constituting a record which has not yet been surpassed. [I am compelled to admit that this last ascent has been called in question by various interested parties, but on grounds which I consider are totally inadequate. I may add that I am acquainted with both regions of the Himalaya in which these ascents are made and that I am supported in my belief in them by most experienced English mountaineers, and especially by those who have visited the Himalaya.]

Before the attempt on Dunagiri, he camped with two Swiss guides at 18,400 ft.(=15.75 in.). Next day, when going up a steep snow slope they 'were all in a nearly fainting condition owing to the great heat and reverberation of the sun's rays from the snow', and on reaching the ridge one of the guides was quite overcome and unable to proceed. Graham continued with only one guide; but after cutting a considerable number of steps in the ice, and reaching a height of not less than 22,700 ft., they were compelled to turn back by the breaking of a storm, and only reached their camp after nightfall. Commenting on this climb, Graham says:—

'Neither in this nor in any other ascent did we feel any inconvenience in breathing other than the ordinary panting inseparable from any great muscular exertion. Headaches, nausea, bleeding at the nose, temporary loss of sight and hearing, were conspicuous by their absence, and the only organ perceptibly, affected was the heart, whose beatings became very perceptible, quite audible, whilst the pace was decidedly increased.'

SIR MARTIN CONWAY IN THE KARAKORAM-HIMALAYA,
1892.

This experienced mountaineer spent eighty-four days above the snow-line, and ascended a peak of 22,600 ft. He notes the ill effects of low pressures on all the members of his party above 19,000 ft.=15.44 in. (four Europeans and four Gurkhas). He also complains of the scorching rays of the sun when traversing the snow-fields, or even when lying in a tent; it nearly always brought an attack of headache, from which he suffered frequently and severely. They slept well at 18,000, 19,000 and 20,000 ft. One Gurkha collapsed below 18,000 ft. and a second at the 19,000 ft. camp. At 20,000 ft. Conway gave up smoking because of its action on the heart not because of breathlessness, though his Italian guide continued to use tobacco. Conway's pulse tracings (on above a dozen occasions) showed that his 'heart was acting badly'. Roy concludes that this was due to fatigue and excitement. ('Sci Appendix' p. 60). At this altitude they indulged in a little brandy with excellent effect, having been compulsorily abstainers for the last three months. No rise of body temperature was observed; the pulse and respiration rate apparently was accelerated only on exertion.

Major the Hon. C. G. Bruce, one of Conway's companions, has since done a great deal of climbing in the

Himalaya, and it is interesting to note ('Alpine Journal', vol. XX. p. 79) his statement that when in good health he does not suffer under 20,000 ft., though when out condition he has felt discomfort at a much lower level. He has invented the term 'mountain lassitude', by which he means 'diminution in the strength of a man due to diminished atmospheric pressure.' This weakness is progressive, and effects the physical, mental, and will powers. He says it is just appreciable in horses racing at an altitude of 2,000 ft.

SVEN HEDIN'S ATTEMPT ON MUSTAGH ATA, 1894.

Though not a mountaineer this traveller spent some time in trying to ascend Mustagh Ata in Turkistan. He was accompanied by a party of Khirghiz, and was able to ride most of the way, but owing to bad weather and the difficulties of the route only reached a height of a little over 20,000 ft. (=14.88 in.). Here he passed the night, and during it he and all his party suffered from severe headaches and were unable to sleep. He also states that he suffered at this time from continual ringing in the ears, slight deafness, a quickened pulse, subnormal temperature, and occasional slight attacks of breathlessness with violent beating of the heart.—(Sven Hedin's 'Through Asia').

NANGA PARBAT EXPEDITION, 1895.

This was undertaken by the strongest trio of English mountaineers that ever attacked a high mountain. Their immunity from mountain sickness is significant. They were accompanied by two Gurkha soldiers trained by Bruce. The two latter and Mummery lost their lives in the attempt.

Professor Norman Collie says of crossing the Mazeno La (18,000 ft.=16 in.) at the commencement of their enterprise, 'I experienced a violent attack of mountain sickness and was hardly able to crawl to the

top. This was the only time any of the party suffered at all, and later a slight headache or lassitude was the only symptom that I ever felt, even when at heights up to 21,000 ft.' (=14.35 in.). Thus on the Diamarai Peak (19,000 ft.=15.44 in.), a difficult ascent of 6,000 to 7,000 ft., the last 3,000 ft. being very severe, they were able to make the Alpine rate of progress of 1,000 ft. per hour. Collie had only a slight headache, while Mummery and Hastings were unaffected.—(Collie's 'Himalaya').

DUKE OF THE ABRUZZI: MOUNT ST. ELIAS, ALASKA, 1897.

Dr. de Felippi records the interesting experiences of the members of this large mountaineering party. It must be noted that they had an extremely arduous sledging expedition of forty days to endure besides the actual ascent of a virgin peak of over 18,000 ft. (=16 in.), in which ten Europeans, all trained Alpinists, took part.

Out of these ten, six were more or less affected by mountain sickness, and of these, three suffered rather acutely. At the commencement of his account Dr. de Felippi records his opinion that the weeks of over-fatigue and discomfort before the actual ascent were the chief cause of his illness.

De Felippi's first symptoms began at about 15,000 ft., heaviness of the legs, difficulty in breathing, palpitations, and headache being all well marked. Disturbance of vision, buzzing in the hear and nausea were all absent, though he had no appetite and took no food the whole day. Even halting the breathing soon became regular, and he notes (as Mosso has done) that smoking a cigarette eased his breathing. All these symptoms went on increasing up to 16,000 ft., and then slowly diminished as he mounted higher, and he argues that though fatigue undoubtedly predisposes

to mountain sickness, yet later on (i.e. at greater altitudes) it must be due to diminished pressure. He thinks that even *during* an ascent it is possible to become adapted to the new conditions.

BRITISH EXPEDITION TO LHASA, 1903-4.

The Jelep La., 14,390 ft., was crossed in midwinter by a force of 10,000 men, the majority natives of the plains of India. Colonel Waddell, I.M.S., says, 'Everyone, oppressed by the rarefied air, had to stop for breath every few yards. Scarcely anyone, even those who rode most of the way, escaped having aching temples and eyeballs; many suffered from actual mountain sickness, and several of the transport animals succumbed on the roadside.' A month later the force crossed the Tang La (15,200 ft.); most had now 'become acclimatised, and suffered little from distressed breathing.' Waddell says that in spite of continuous exposure to excessive cold and the rarefied air, the general health of the force kept remarkably good while at heights of 10,000 to 15,000 ft. The men were 'specially selected to start with, then by a process of natural selection the weakest soon fell out, and those who remained represented the survival of the fittest.' The Sikh Pioneers and Madras and Bengal Sappers and Miners were constantly employed in road-making. 'The results of this exposure to the cold and altitude were chiefly pneumonia, frost-bite, and mountain sickness.' Everyone wore green or smoked glass goggles against snow-blindness. 'Mountain sickness was experienced by nearly everyone more or less at the high altitudes, in the form of headache and nausea, with occasionally retching and vomiting.' 'Indigestion, which was widely prevalent, was largely due to bad cooking arising partly from hurry but chiefly from insufficient fuel (yak dung), and the lowered boiling point of water, . . . insufficient to burst the starch grains of rice.' There

was no scurvy. Plenty of fresh meat was issued throughout the campaign. 'There was an undoubted craving for an extra amount of sugar and butter.'—(Waddel's 'Lhasa').

NOTES TO PART I.

NOTE I.—ON THE HIGHEST INHABITED PLACES IN VARIOUS REGIONS.

The St. Bernard Hospice (8114 ft.) is the highest permanently inhabited spot in Europe, and the observatory on the summit of Mont Blanc (15,871 ft.) is used intermittently for a week or more at a time.

In the Himalaya of Lahaul Kunawar Garhwal and Kumaon there are nine villages situated at an altitude of 11,000 to 12,000 ft. In Ladakh villages are found up to 13,000 ft. In Western Tibet there are several monasteries at an altitude of over 15,000 ft., besides summer villages and encampments, with shepherds' shelters, up to 16,500 ft. Thok Jalung goldfields (16,339 ft.) are inhabited throughout the year.

Turning to the Andes we find the important city of Potosi at 13,665 ft. and Cerro de Pasco at 14,098 ft. Dances and bull-fights take place frequently, but it is usual for new comers to experience some discomfort at first. In the Andes at least one mine is to be found at 17,000 ft.

NOTE II.—ON BALLOON ASCENTS.

In 1804 Gay-Lussac is believed to have ascended to a height of nearly 23,000 ft.

In 1862 Glaisher ascended to 27,000 ft. (11.5 in.), and six weeks later with Coxwell to 29,000 ft. (10.7 in.) (or considerably more according to some accounts). On this latter ascent Glaisher's arms became helpless, and he could not see to read his instruments. He lost consciousness for a minute or two, but was aroused by Coxwell. He finally lost consciousness altogether, and Coxwell lost the use of his hands, but opened the escape-valve with his teeth.

In 1874 Croce-Spinelli and Sivel ascended to 24,000 ft. (12.85 in.), taking oxygen with him. The former was perceptibly affected, and his pulse rose to 140. Next year, with the addition of Tissandier, they rose in two hours to 26,000 ft., and for two hours more hovered between 26,000 ft. and 28,000 ft. (12 to 11 in.). The two former died of "suffocation;" their faces were cyanosed and their mouths full of blood. Tissandier narrowly escaped, being several times unconscious, and thus was unable to give anything like an exact account of what happened. He notes that one time he could not raise his arm to take hold of the oxygen tube, having become gradually weaker without realising the fact.

Recently Berson and Luring attained the record height of 34,500 ft. Zuntz states that the inhalation of oxygen was completely successful.

PART II.

PERSONAL OBSERVATIONS ON MOUNTAIN SICKNESS.

During the last twelve years I have made a large number of ascents in the Alps, the Causasus and the Himalaya, having been on ten occasions to heights of over 19,000 ft. (=15.44 in. or $\frac{1}{2}$ an atmosphere) and on twenty other occasions to heights of over 15,000 ft. In addition to this, I lived at a mean altitude of 15,000 ft. for five weeks when travelling through S. W. Tibet last year. I therefore think it is not out of place to bring under consideration my own experience of mountain sickness*

In my case prolonged over-exertion at sea-level brings on an attack of migraine on the following day, generally lasting 12 hours, and formerly always, but during the last 12 years rarely, accompanied by vomiting.

In the Alps a long or difficult ascent, if for any reason the pace has had to be forced, has almost always been followed by headache, be the mountain Mont Blanc with an atmospheric pressure of 17.4 in., or only some small peak of 10,000 ft. (=21.5 in.). The headaches always reach a maximum during the descent, although as with ordinary migraine, I usually recover towards evening. They are never occipital, but resemble in character the migraine from which I have always been a sufferer. Indeed, one occasion I started to climb a peak of 10,000 ft., having wakened with an attack of migraine. After a difficult climb the descent was accomplished, and the symptoms of this attack of migraine exactly agreed with the symptoms of the other attacks

*Born, 1875; height, 5 ft. 4 in.; weight, 10-10 $\frac{1}{2}$ stone; chest, 33 $\frac{1}{2}$ in. (35 $\frac{1}{2}$ in. when fully expanded). No organic disease. Subject to migraine about once a week, with strong family history of same. Cannot breathe through the nose without distress when walking fast at sea-level.

of headache from which I have suffered in the course of mountain ascents, except that I felt on this occasion much greater weakness of the legs than I have ever experienced at any other time. This latter symptom was undoubtedly due to want of food. As I started with a headache, I ate no breakfast, and took practically nothing during the whole climb, which lasted over 15 hours.

I find by experience that a very short night's rest is more certain to bring on an attack of headache than anything else, and in consequence start at 4 or 5 a.m. instead of 1 or 2 a.m. whenever I can persuade my guides or companions to do so.

In the course of these headaches the usual nausea of migraine has on two occasions culminated in vomiting. On both occasions I was descending peaks of 15,000 ft., up which it had been necessary to climb very fast. In 1899 I climbed the five peaks of Monte Rosa (14,960 ft. to 15,217 ft.) in one day, having necessarily to go very fast, and being exposed in the early morning to great cold. Headache commenced on the first peak, and on the fourth I suffered from nausea and could not eat. Continuing on to the fifth peak, I rested 25 minutes and had some sleep. On waking, I felt better, and during the descent the headache gradually became less intense. It is impossible that in this case the low pressure experienced (18 in. for about 8 hours) was the real cause of my symptoms, but my breathing was never labored, and it should be noted that this excursion was in the nature of a *tour de force*, and has never, I believe, been accomplished before or since. My companions, two Swiss guides, never showed the slightest signs of distress.

On both my ascents of Mont Blanc (15,781 ft.=17.4 in.) the last 1,350 ft. had to be climbed very quickly (65 minutes) owing to the approach of bad weather. On both occasions I suffered from headache during the

descent, but on the second occasion I also experienced extreme breathlessness during the last part of the ascent. In 1899 my companions were two guides, and in 1902 one amateur. None of them were at all distressed. Twice in the Alps I have encountered tourists who were prostrated with headache and nausea at heights of about 11,000 ft. In both cases they appeared to me to be beginners and in bad training. A companion of mine after accomplishing a difficult ascent without guides was attacked at a height of less than 13,000 ft. by severe headache, ending in vomiting. This attack exactly resembled the migraine that he also suffers from.

As regards these headaches, indistinguishable both in myself and others from ordinary migraine, I think it may be fairly maintained that the reduction of atmospheric pressure experienced could not have been the cause of the symptoms complained of, except in so far as it increased or accelerated the onset of fatigue due to the prolonged physical and mental exertion which was the real exciting of these attacks.

In 1903 I went to the Caucasus with an amateur of great strength, skill and experience, as my only companion. On August 5 we made the first ascent of Tiktingen (15,267 ft.) in very bad weather. The climb was very arduous and difficult, occupying 18 hours, but I was never conscious of any distressing sensations. On August 9 I experienced distinct air hunger, weakness of the legs, and slight headache during the last part of the ascent of Tetnuld (15,918 ft.). On August 13 and 15, after several arduous days of riding and walking, I experienced extreme feebleness and lassitude with occasional shortness of breath when climbing from 10,000 to 12,000 ft. But on both occasions, during the last part of the ascents (peaks about 13,700 ft.), I quite recovered my usual powers, and climbed steep

and rather difficult rocks without any distress. We were out 14 hours and 19 hours respectively on these occasions. The stimulus of excitement on virgin peaks probably accounted for the improvement in my powers. Owing to bad weather we were now compelled to take things easily for several days. On August 24 we made the first ascent of the W. peak of Shkara (about 16,700 ft.=16.8 in.), the most difficult high ascent I have ever made. The ascent from our bivouac was about 6,000 ft., and occupied 11 hours of very fast going, but during it I experienced no distress. We were, however, benighted at about 14,700 ft. on the descent, and here I suffered slightly from headache and loss of appetite, though I was able to smoke. This should not be attributed to low atmospheric pressure when all the circumstances are considered. On no occasion did I observe any symptoms of distress in my companion ('Alpine Journal', vol. XXII.).

In 1904 I ascended nine peaks in the Alps, and twice experienced my usual headaches during the descent of peaks of only 12,000 ft. On both occasions, however, the climbs were long, and the heat and glare of the sun very trying.

In 1905 I visited the central Himalaya, accompanied by an Italian guide, A. Brocherel, aged thirty, and a first-rate Alpine porter, H. Brocherel, aged twenty-five, both men of exceptional physique.

In my ignorance I thought that I could discard my thick sola topi, and wear a soft cloth hat in the upper valleys. As a result, I contracted severe headaches, culminating in vomiting on three out of five days (May 27—June 1) spent at heights ranging from 11,000 ft. to 16,000 ft. On none of these occasions was I conscious of shortness of breath, although I did notice that it was difficult to hold the breath while aiming a

rifle, and further I observed definite Cheyne-Stokes respiration in H. B. when sleeping at 14,600 ft.

On June 2 we crossed a difficult snow-pass of 17,750 ft. On the way I suffered extreme discomfort from the heat of the sun and the glare from the snow. I was still wearing a soft hat, and soon developed a severe headache. On reaching the summit of the Pass I vomited, although I did not attempt to eat, but recovered by nightfall. After this I always wore a thick sola topi.

We next tried to ascend Nanda Devi. It was impossible, as before, to take native coolies with us, and we had to carry everything ourselves. The guides carried 50 lbs. each, and I took about 25 lbs. On June 7 we reached 17,400 ft., and camped there without any difficulty. We were heavily loaded, and naturally climbed slowly. Next day the slope up which we had to climb steepened considerably, and steps had to be kicked or cut continuously in the snow. Our loads had only been lightened by the food we had eaten the day before, and both A. B. and myself undoubtedly felt more breathless than we did the day before, and had to stop and rest frequently. H. B. never showed any distress. We camped again at 19,100 ft. (=15.4 in.), having, owing to several halts and the time spent in step-cutting, taken 8 hours to mount 1,700 ft. I had a slight headache in the evening. On June 9 we left our loads behind us and continued on till we reached a height of about 20,000 ft. (=14.88 in.) when we turned back owing to the increasing difficulties ahead of us, and finally descended with our loads to about 13,000 ft. On this day I was not aware of any breathlessness or other abnormal sensations. I had also been able to sleep moderately, eat well, and smoke with pleasure at our two bivouacs. The entries in my

note-book are, however, very badly written, while taking photographs and reading the barometer was an unwelcome task.

Our next expedition was against Nanda Kot, and also ended in failure, but not owing to mountain sickness. This time we could get coolies up to 16,300 ft., where we camped, and next day (without loads) reached a height of at least 21,000 ft. (≈ 14.35 in.) in about 8 hours, up steep glacier and snow slopes, when we were compelled to give up the attempt owing to the danger of starting an avalanche. I felt very tired during the descent, and had a slight headache, but was not conscious of any more definite symptoms of distress.

On June 18 we crossed a pass of 18,000 ft. (≈ 16 in.), the actual ascent being about 2,650 ft., and occupying 6 hours. We were again heavily loaded, the guides carrying 50 lbs. each, and myself about 25 lbs. We purposely went very slowly, often stopped to rest, never suffered from breathlessness or any other symptom of distress, and after a difficult descent lasting more than 12 hours, I felt nothing more than an appropriate feeling of fatigue.

On July 10, on the Nampa range in Nepal, at 16,000 ft. (≈ 17.23 in.) I experienced air hunger and extreme lassitude while ascending a windless gully over beds of loose and rolling stones. I and two of the three Bhotias with us suffered also from headache, while even A. B. and H. B. went slowly and stopped several times to recover their breath. All this passed away on reaching the main ridge and resting in a cool breeze.

On July 14 we crossed the Lipu Lekh (16,780 ft. ≈ 16.75 in.) into Tibet, our party consisting of an English official, the two Italians, and about 50 natives. The former was in very poor health after enteric fever,

and although he rode the whole time, suffered from palpitation of the heart and faintness. Several of the servants and escort from the lower foot-hills were completely prostrated by headache and exhaustion when we reached our camp on the Tibetan side. The gradient was very easy, and our yaks and ponies did not seem to feel the altitude.

We then spent a week in trying to climb Gurla Mandhata (25,350 ft.), spending five nights at pressures of less than half an atmosphere (=19,000 ft.). On July 18, with the two guides, I made a bivouac at 19,000 ft., our impedimenta and food being carried up by six Bhotia coolies. The latter straggled very much during the last 1,000 ft. of the ascent, and were complaining of headache and breathlessness at 19,000 ft. But it must be remembered that they were carrying 30 to 40 lbs. apiece. I developed a very severe headache, and could not eat; my condition was certainly aggravated by the fact that I had had nothing to drink for the 10 hours since leaving Taklakot, nearly 6,000 ft. below. I also experienced lassitude and breathlessness sometimes amounting to air hunger. A. B. and H. B. showed no signs of distress. On this day we disturbed a herd of wild sheep (*ovis nahura*). They showed their usual agility, and finally disappeared over the ridge at a height of nearly 20,000 ft. (=15 in.). On July 19 I still had some headache and felt too tired to climb, so spent the day at thi spot. My appetite was bad, but our food was very unappetising. On July 20 we started off at 2 a.m., but found our route impracticable, and had to turn back at between 20-21,000 ft. (=14.5 in.).

On July 22 we started from about 16,000 ft. with five Bhotia coolies, and in $7\frac{1}{2}$ hours reached a height of about 20,000 ft (=14.88 in.). Again I had a bad headache, but could eat. The Bhotias were exhausted

and were sent down as usual. The Italians appeared to feel nothing.

On July 23 we did not start climbing till 5 a.m., as I felt very feeble. As the day wore on, however, I felt, and walked, very much better. At 2 p.m. we reached a height of about 23,000 ft. (=13,33 in.) on the main ridge of Gurla. We only carried food and a few spare clothes. The climbing was easy. We spent the night in some rocks at about 21,000 ft. On July 24, after a very uncomfortable night, we climbed for nine hours and again reached a height of at least 23,000 ft., but this time the route lay over the Gurla Glacier and was exposed to the full rays of the sun, while every breath of wind was shut out by the ridges on three sides of us. The guides had lost their tops in an accident the day before, and A. B., who had merely wrapped a jersey round his head, collapsed with a severe sun headache at 2. p.m. I particularly noticed that he showed no signs of respiratory distress. We decided to spend the night where we were, and H. B. dug a hole in the snow for us to sleep in. I tried to help him, but found to my surprise that the work was altogether beyond me. I was literally gasping for breath after two or three minutes' digging. H. B. showed no symptoms of distress during the hour he was engaged in this work.

We all three slept during the night of July 24-25, but my sleep was much interrupted, A. B. was constantly moving about in his sleep, and our breathing was very irregular. We were now short of food. Starting at 2.30 a.m. on July 25 we were pulled up in about an hour's time by a big crevasse, and had to wait for daylight to find some way round it. I felt extremely feeble and depressed, could not endure the cold, and insisted on giving up the attempt, much to the disgust of H. B. I think that two nights of

broken sleep in the open with no covering and insufficient food had more to do with my condition than the altitude which, judging from the surrounding peaks (already triangulated), must have been about 24,000 ft. (≈ 12.85 in.). At any rate, I know that it was want of moral courage and not physical incapacity that made me give up the ascent. A. B. went well during the morning, although he still had slight headache, and H. B. never at any time showed the least signs of distress, or any abatement of his extraordinary physical powers.—('Alpine J.,' vol. XXIII.)

I now spent more than a month travelling at a mean altitude of 15,000 ft. (≈ 17.88 in.). On August 3 I had a mild attack of influenza (I had it more than twenty times. On August 7 I contracted a severe attack of diarrhoea, due probably to bad water, which lasted for a week without intermission. When it was over, I was so weak that I could hardly walk at all, and during the next fortnight I made a very slow recovery. I was compelled to ride a yak, and was incapable of performing any exertion without becoming breathless. I look upon the extreme slowness of my recovery as a direct result of the continuous low pressure experienced. However, on August 28 I was able, with great labor and fatigue, to walk over the Chor Hoti Pass (about 18,000 ft. ≈ 16 in.), the same day descending to 12,000 ft. I had spent thirty-seven days at an atmospheric pressure of less than 18 in., and undoubtedly experienced great relief and rapid restoration of strength on reaching these lower levels.

It will be noticed that I have hardly ever referred to the pulse-rate. To my mind, very little is to be learned from it. Either at the sea-level or at 23,000 ft. (≈ 13.3 in.) violent exertion will always produce in me an uncomfortable palpitation of the heart, and climbing of any sort will always increase my pulse-rate,

but I could never find that the altitude had any effect on it while I was at rest.

To summarise briefly my mountaineering experience, it will be seen that I have suffered from air hunger, that is to say, breathlessness sufficient to cause me to halt occasionally, once in the Alps, once in the Caucasus, and once in Nepal at heights of from 15,000 to 16,000 ft., and on several occasions and under various conditions of health in Tibet at heights of from 15,000 to 23,000 ft. Yet at such altitudes I have more often than not been free from this symptom. I have already dealt with attacks of migraine in the Alps, but in addition to this I have usually suffered from headaches at altitudes of over 19,00 ft. (≈ 15.44 or $\frac{1}{2}$ an atmosphere). At these altitudes I have also been conscious of an indefinite deterioration of the physical and mental powers which I can best describe as lassitude and apathy. But it is to be remarked that at 23,000 to 24,000 ft. I have never experienced so extreme a degree of physical weakness and lassitude as on the two occasions previously mentioned at 10,000 to 12,000 ft. in the Caucasus. Both in the Alps and the Himalaya I have suffered severely from the effects of the sun. I think my appetite begins to fall off at an altitude of about 15,000 ft. I have never suffered from bleeding at the nose or other mucous surfaces, fainting, giddiness, ocular or aural symptoms, nor have I ever observed such symptoms in others. I have invariably been more markedly affected than any of my companions, and usually the only one of the party to be affected at all.

As they do not altogether coincide with my own, I will here quote the experiences of my cousin when on a shooting trip in Ladakh and Tibet this year. He was for forty days at an altitude of over 15,000 ft., of which twenty-seven days were passed at altitudes of over 17,500 ft. (≈ 16.3 in.). His highest point was

the Masemic La (18,400 ft.=15.8 in.). He noticed that he had to eat slowly, and that drinking made him pant for breath. Like all other sportsmen at high altitudes, he found that it was always necessary to lie down and rest before taking a shot, and that holding his breath while aiming was followed by violent panting, as was sudden movement of any sort.

He was accompanied by four Cashmiris from villages at about 6,000 ft.; these men certainly felt the altitude as much as R. L. Also by ten Ladakhis from villages, at 14-15,000 ft. They went slower than in their own valleys, but showed no other sign of discomfort. None of the natives carried loads, which were taken by thirteen ponies and four yaks. No conclusions could be drawn as to the effects of low pressure on these animals owing to the poorness and extreme scantiness of their food. A diminishing flock of eight sheep always kept up with the party without apparent difficulty.

R. L. considers that he became somewhat acclimatised. If his pace did not improve up hill, yet his breathing was very much less laborious towards the end of the trip. He and his men had plenty of good food during the whole of this arduous journey, and to this circumstance, so unusual in the case of purely mountaineering expeditions, is doubtless due his successful endurance of low pressures for so many consecutive days.

PART III.

THE CHARACTER AND CAUSES OF MOUNTAIN SICKNESS.

On referring to Part I. and II. we are able to form some idea of the great variety and the probably complicated causation of the symptoms generally included under the term mountain sickness.

We find that most mountaineers admit of some breathlessness and some weakening of their powers, at

pressures of less than half an atmosphere (19,000 ft.), but that none who have reached such altitudes, except some members of the Aconcagua expedition of 1897, have been actually incapacitated from completing ascents up to 24,000 ft (≈ 12.85 in.), which is at present the mountaineering record. Nor do these symptoms increase in severity as the pressure diminishes from half an atmosphere or more down to 13 in. or less. Such symptoms as do occur may be more definitely described as lassitude and disinclination for exertion while at rest, with muscular weakness and acceleration of the cardiac and respiratory rhythm on exertion. For this condition Bruce's term 'mountain lassitude' seems to me far more suitable than the very indefinite term *malaise*. A few mountaineers suffer frequent headache, and still fewer, including myself, note loss of appetite and deterioration of the mental powers at these altitudes.

We have a second group of cases occurring at altitudes of between 14,000 ft. (≈ 18.5 in.) and 17,000 ft. (≈ 16.6 in.). These are of a more severe type, and the physical prostration may be so great that the climber is temporarily unable to proceed with the ascent. These attacks may be of sudden onset, headache of a severe type is usually present, weakness of the limbs is marked, the heart's action becomes irregular, breathing is labored, rapid and irregular, nausea is often present, and in rare cases actual vomiting may occur. If this second group of cases is carefully studied it will be found that in almost every instance the climber was either in poor condition and commencing a mountaineering tour, or admittedly fatigued by previous exertion and exposure. It will likewise be noticed that these sufferers have almost invariably succeeded in subsequently reaching far higher altitudes without a recurrence of similar symptoms.

Thirdly, we have numerous cases of a still more severe type occurring at altitudes of from 9,000 ft. up to about 15,000 ft. These more nearly approach the classical, one might almost say fabulous, descriptions of mountain sickness. Bleeding from the nose or other mucous surfaces does not now occur, although 200 years ago rash travellers ascending Skiddaw were warned against this danger. Ocular symptoms, vertigo, and tinnitus are very rare. But headache is intense and vomiting often severe, and there is complete physical prostration. Such attacks frequently occur during the descent of mountains; they are prone to affect sufferers from migraine and others with weak spots in their constitution, but as a rule it is the inexperienced and untrained tourist who is attacked, although several instances will have been noted in Part I. of experienced mountaineers saying that they have never felt so ill at altitudes of 20,000 ft. (=14,88 in.) and more, as they have felt (under special circumstances of fatigue or lack of training) at such comparatively low elevations as we are discussing (9,000 to 15,000 ft.). My own experience is quite in accord with this.

In the first of these three categories we are dealing with a small group of skilful mountaineers—a sort of survival of the fittest—who have attained the highest altitudes yet reached on the surface of the globe. The lassitude which most of them are unable to escape (but which a few do escape) seems to be due entirely to the diminished supply of oxygen consequent on the reduced atmospheric pressure experienced. The second category deals also with trained mountaineers, but these cases cannot be so easily accounted for; it is obvious from the difference in symptoms that another element has come into play which is not merely want of oxygen, for it may, and usually does, disappear at

still lower pressures. The third and most numerous category embraces a much larger and less trained class, and in the subsequent sections of this paper I hope to show that their symptoms are mainly due to fatigue and exhaustion, and are only indirectly attributable to the diminished oxygen supply in that this may have increased or accelerated the onset of fatigue symptoms.

Fatigue itself undoubtedly renders the individual more liable to the distressing effects of low atmospheric pressure, and fatigue is very difficult to avoid on mountain ascents. On high ascents mountaineers are frequently short of food owing to the fact that they have to carry everything upon their own backs. Further, they are frequently unable to stop long enough or often enough to make proper meals, owing to the technical difficulties met with during mountain ascents or to unfavorable weather conditions. Want of sleep is also a constant source of weakness to the mountaineer. Even in an alpine club hut it is often almost unattainable while at still higher altitudes a sleeping-bag and a tent of the smallest and flimsiest character marks the highest attainable degree of comfort.

The great similarity between the symptoms of mountain sickness and anaemia has been called attention to by Hepburn. The lassitude and tired feeling in the legs, with disinclination for exertion when at rest, the helpless feeling of the lower extremities while in motion and the acceleration of the cardiac and respiratory movements are almost universal in bad cases of chlorosis. Headache, as with mountain sickness, is sometimes present, as are also the fainting fits which have been for some inexplicable reason supposed to occur in cases of mountain sickness. In the case of chlorosis the symptoms are almost certainly due to the poorness of the haemoglobin, despite an adequate sup-

ply of oxygen. In climbing at high altitudes we have rich haemoglobin in the presence of a reduced supply of oxygen. But despite this similarity, which points to imperfect oxygenation as the cause of mountain sickness, I think there are other factors to be taken into account.

The great element of fatigue in mountaineering and its effects on the climber are obscured to a certain extent by the fact that fatigue renders the individual more liable to mountain sickness. The evidence of mountaineers to this effect is incontrovertible, especially as to that exhaustion produced by a previous exposure to cold and privation of several days' duration. Mosso's notes ('Life of Man in the Alps') on the miners engaged in blasting a platform for the Gnifetti hut (14,000 ft.), and who only began to feel the altitude when tired by several days' hard work from a more scientific example of this well-known fact.

NOTE ON THE VALUE OF SUGAR TO THE MOUNTAINEER.

In connection with the foregoing section it may be interesting to note the great value of sugar as a food during mountain ascents. I find by experience that sugar in various forms is the most sustaining diet for mountain expeditions. Jam usually forms an important part of the food supply of most experienced climbers. Frentzel has demonstrated in the laboratory the extraordinarily rapid recuperative effects of sugar in cases of fatigue. All this only emphasises the enormous energy production necessitated by mountain ascents and the consequent tendency to fatigue.

CONCLUSION.

In conclusion, I would point out the apparent paradox that severe symptoms have not attacked mountaineers at the highest altitudes (23,000-24,000 ft=13 in.) yet recorded, although several of these individuals

have suffered at considerably low elevations on other occasions. That is to say that the correspondence between the extent to which the atmospheric pressure is reduced and the incidence of the symptoms of mountain sickness is but an irregular one. Further, that these successful mountaineers are all men of extraordinary physique; on the other hand, the most numerous, cases of sufferers from mountain sickness are the untrained, the unfit, and those of only an ordinary or an inferior physique and power of resistance to fatigue in affirming that the extraordinary physique and power of resistance to fatigue of Alpine guides is the cause of their almost complete immunity to mountain sickness. Acclimatisation is not the cause of this superiority. Guides have a much greater objection than amateurs to spending several consecutive days at low pressures even in the Alps.

Lack of oxygen will not explain this anomalous incidence of symptoms, while liability to fatigue will do so. In short, mountain sickness consists of two elements. Firstly, 'mountain lassitude' which few can escape at altitudes of over 19,000 ft. (15.4 in. = $\frac{1}{2}$ an atmosphere), but which does not increase in severity up to the highest altitudes yet recorded, and which is due to imperfect oxygenation; hence prolonged residence at such pressures cannot but be harmful, considering the great strain which is thereby thrown on the whole system. Secondly, we have the symptoms of fatigue and exhaustion, which are more likely to occur during the ascent of mountains than under any other conditions to which the human economy is exposed, and which affect the untrained or inexperienced far more often than the skilled mountaineer, whose whole training tends to make him husband his powers and enables him to avoid unnecessary fatigue.



Photo Dr. Sisley

THE EMBARRAS RIVER
Ten Miles from junction with McLeod



Photo Dr. Sisley

THE McLEOD RIVER
Ten Miles from Big Eddy



Photo Dr. Sisley

THE McLEOD RIVER
Ten Miles up from Big Eddy

FISH OF THE EASTERN SLOPES OF THE ROCKIES.

BY EUSTON SISLEY.

The streams on the eastern slope of the Rocky Mountains have become famed as the home of the Trout and other game fish such as the Grayling and the Rocky Mountain Whitefish.

This is an immense territory reaching from the boundary line in the South to the Athabasca and probably much farther north.

Several great rivers take their rise by numerous streams of all sizes from the mountain slope. These are:

- (1) Saskatchewan—South Branch.
- (2) Saskatchewan—North Branch.
- (3) Athabasca.

These streams may be roughly divided into four groups, according to the kinds of fish indigenous to them, beginning from the south:

(a) All streams from the boundary north to the Bow River, including its tributaries:

The Cutthroat Trout (*Salmo Clarkii*).

The Bull Trout (*Salvelinus Malma*).

Rocky Mountain Whitefish (*Coregonus Williamsonii*).

(b) Streams entering into and forming the Red Deer River:

Rocky Mountain Whitefish (*Coregonus Williamsonii*).

Bull Trout (*Salvelinus Malma*).

Brook Trout (*Salvelinus Fontinalis*).

(c) North and South streams entering into the North Saskatchewan River. No thorough investigation has been made of these waters up to the present time, so that no definite statement can be made as to what fish are found in them.

(d) Branches of the Athabasca River, such as the McLeod with its branches, the Embarras for example:

Grayling (*Thymallus*).

Rocky Mountain Whitefish (*Coregonus Williamsonii*).

Bull Trout (*Salvelinus Malma*).

and another valuable species of trout of which full particulars cannot be given at present.

Owing to the confusion that has taken place in the past from the fact that different names have been applied to the same fish by different people, it may not be out of place to give some description of the above varieties, naming them in order of merit, with due regard to their game qualities.

(1) CUTTHROAT TROUT (*Salmo Clarkii*).

This is a very beautiful and gamey fish so called from the fact that it has a red streak on the inner side of each lower jaw, which gives it the appearance of having its throat cut. At maturity it reaches the weight of four pounds. It has a small mouth with jaws well supplied with teeth, the palate being flat, with the vomer also studded with teeth, this being characteristic of a true Trout. The scales are small in size, scarcely visible to the naked eye, the back is dark sides and belly of light color tinged with pink ordinarily, but at spawning time it is a brilliant red. The whole body of the fish is covered with black spots. It lives wholly on insects, such as ants, wasps, moths, flies, beetles and grasshoppers. It has rarely been known to swallow other fish. Its spawning time is

during April and May. It rises readily to the artificial fly and when caught puts up a very gamey fight.

(2) GRAYLING (*Thymallus Montanus*).

This is a very game fish and is not found in many Canadian waters. The upper jaw is short and square, while the lower one is slightly longer, which gives it somewhat of a bull-dog appearance, although it is not coarse in any way. The mouth is supplied with teeth of similar arrangement to that of the Cutthroat Trout. It is dark colored in the back and light underneath, with well marked scales. On each shoulder about a dozen dark spots are to be found. It has a dorsal fin peculiar to itself, which is longer than usually found in other fish and oval in shape. It is very similar in its habits to the Cutthroat Trout. It is not found south of the Athabasca River.

(3) ROCKY MOUNTAIN WHITEFISH (*Coregonus Williamsonii*).

This is the fish that is usually and mistakenly called the Grayling. It is a true whitefish and is closely related to the Commercial Whitefish (*Coregonus Clupeformis*). It is a very gamey fish, rises well to the artificial fly, has a small mouth with no teeth, the lower jaw being shorter than the upper. This fish is gray on the back, fading downwards to white underneath and has well developed scales. It lives wholly on insects, and spawns in September and October.

(4) BULL TROUT (*Salvelinus Malma*).

This is not a very game fish and is not a true Trout, but belongs to the char species. It lives almost wholly on fish of its own and other species, and is usually found at the bottom of deep pools, hiding behind a large stone ready to pounce upon a small fish which may be passing by. Is not a game fish, inasmuch as it will not rise to the artificial fly, and puts up no fight

when taken by other means. It is a dark colored fish with two rows of dull pink colored spots on each side. Mouth supplied with teeth but the palate is high and smooth and the vomer is free of teeth. It is a coarse fish with a large head, which is in the adult fish about one third of the whole.

(5) BROOK TROUT (*Savelinus Fontinalis*).

This gamey little fish like its close relative the Bull Trout is not a real Trout. It is a very beautiful fish with its red markings and its bright pink spots. It lives to a great extent on fish of its own and other species. It rises readily to the artificial fly and puts up a hard fight for liberty when caught. It is a good table fish, being very palatable.

(6) LAKE TROUT (*Savelinus Namaycush* Walb).

On this slope there are a few small lakes, of which Lake Minnewanka near Banff might be mentioned. In this lake is found the Lake Trout (*Savelinus Namaycush*), another representative of the char species. In some cases it grows to a large size and lives almost wholly on fish. It does not rise to an artificial fly, but can be taken with troll, and furnishes a certain amount of sport in this way. It spawns in the fall of the year, and is a good table fish.

Besides the above game fish, some coarse fish are to be found, especially in the lower stretches of these streams and pretty universally over the whole territory. The principal ones are: (1) Pike—(*Lucius*), (2) Suckers—(*Catostomus*), and (3) Ling—(*Lota Maculosa*). Of the Suckers there are several varieties. The Pike and Ling are both very destructive of other species especially of those superior to themselves. The Pike is a very good table fish, but the Ling is of such ugly appearance that few could be tempted to try it, although its flesh is said to be quite palatable.



Photo Mrs. Claus Schaffner

KAMLOOPS TROUT, *SALMO GAIRDNERI* KAMLOOPS (Jordan)

FISH OF THE WESTERN SLOPES OF THE ROCKIES.

BY JOHN MACOUN.

The leading fish in all our inland waters are species of Salmonidae. The genera *Salmo*, *Salvelinus*, and *Oncorhynchus* give us our trout and salmon. Of the genus *Coregonus*, our whitefish, one, the *Coregonus Williamsonii*, is improperly named 'Grayling' by miners and others.

In the Rock Mountains are three species of trout, which are respectively the Great Lake Trout, the Bull Trout and the Rainbow Trout. The names given are applied in other districts to different species, so that the local name has no real significance.

The 'Rainbow Trout' or 'Cutthroat Trout' (*Salmo mykiss*) is the black-spotted trout of the Rocky Mountains, whose waters enter the branches of the Saskatchewan. This form is found in the Bow River at Banff and on Old Man River farther south. Passing the summit of the Rocky Mountains and descending towards the Columbia, another black-spotted species is met with, named Steel-head or Gardner's Trout (*Salmo gairdneri*). This species is found in the Columbia and all its tributaries, and hence in all the streams in the Selkirk Mountains.

The Red-spotted Trout, Dolly Varden or Bull Trout (*Salvelinus Malma*) is the real Brook Trout of the mountains from the British Columbia boundary to Alaska. It is this species that gives zest to mountain fishing and real sport to the angler. Like its relative, the Brook Trout of the east, it is found in

streams of all sizes, and, in consequence, weigh from a few ounces to over twelve pounds at the mouths of some of the northern rivers.

The Great Lake Trout (*Cristivomer Namaycush*) and the Blueback or Fraser River Salmon (*Oncorhynchus Nerka*) are found in suitable localities, the former chiefly in the large lakes, and the latter in the Columbia all round the Big Bend. There seems to be more than one form in the Arrow Lakes, as many fish were taken in July that were just about ready to spawn.

The five fish mentioned above are all that need particular mention. The Cyprinidae (minnows) and the Catostomidae (suckers) are represented by many species, which largely serve as food for the Salmonidae. Some of the species grow to a large size in the Columbia, and eaten when no better fish can be obtained, but as a rule the flesh is too soft.

A NOTE ON THE GEOLOGY OF THE SELKIRK MOUNTAINS.

BY A. P. COLEMAN.

The Geological Survey of Canada has done very little work in the Selkirk Mountains, and the only report on them was made by Dr. Dawson about twenty years ago. Following the C.P.R. from west to east there are first about seventeen miles of very ancient rocks, granites and gneisses of the Archaean. These rocks, with the nearest parts of the Gold Range to the west, represent the old nucleus or "protaxis" of the western ranges. They probably formed an important mountain range in the earliest times, but being so old, have suffered the penalty of age in mountains and have been greatly cut down.

Following the granites, eastwards there are 15,000 feet of dark slate and schist, once muddy sediments on a sea bottom, now thrown into folds, first a syncline or downward fold, afterwards an anticline or upward fold. Then come lighter colored series of quartzites and conglomerates, often schistose with the shimmer of mica scales. Near the summit these rocks make a syncline, but toward Beaver Creek they have been bent into an anticline and broken across by a great fault. The thickness of these rocks Dr. Dawson puts at 25,000 feet.

Coming out towards Donald, there are later rocks (Cambro-Silurian) also folded and transformed largely into lustrous slates.

Fossils are so rarely found in the Selkirks that the age of these thick deposits is quite uncertain. Dr.

Dawson calls everything Cambrian between the granite and the eastern Cambro-Silurian.

The granite and gneiss of the western Selkirks are very ancient eruptive rocks, highly crystalline and formed far below the surface. It is rather remarkable that there are very few undoubted eruptive rocks farther east and none along the line of the railway. In the Gold Range to the west there were great volcanic eruptions with lava sheets and thick beds of ashes after the Selkirks had been elevated, and there are important areas in the southern Selkirks, toward the Boundary.

As the Selkirks are a very old range, far older than the Rockies, they have undergone more destruction, and the great glaciers of the Ice Age had much to do with the moulding of the slopes and valleys, and the carving of the beautiful lake basins.

The above note on the Geology of the Selkirk Mountains is in response to an inquiry by The Journal as to whether the Selkirks are of Volcanic origin. It is published for the information of our readers.—Ed.

THE ORIGIN AND HISTORY OF THE SELKIRKS.

BY E. M. BURWASH.

There are two criteria by which we can judge of the origin of a mountain-range, namely (1) the kind of rocks included in it, and (2) the structure; that is, the forms in which these rocks are found, whether stratified, folded or massive, etc. In the Selkirks, the most westerly part of the range for some distance east of Revelstoke, consists of archæan rocks, which are partly sediments, and partly lavas which were intruded between the previously deposited strata or overflowed their surface and were afterwards buried. These rocks once formed part of a very ancient range which again sank below the sea and was buried by later sediments long before the uplift which built the present range took place. Further west, at least as regards that part of the range which is crossed by the Canadian Pacific Railway, the rocks appear to have been originally laid down under the sea. They were originally sands, clays, and beds of shells of various kinds. The clays were mixed in part with remains of plants and also with the shells of the animals that inhabited the sea. These deposits hardened later into sandstone, shale, and limestone respectively, and have since been further altered by pressure into quartzites, schists, and more or less crystalline limestone. There were also included in the shales a certain amount of volcanic ash, but this appears to have been blown out to set by the winds from volcanoes on the land, which then lay to the west of the present Selkirk range. The materials of the range are therefore volcanic, but came from volcanoes situated at a distance.

The deposition above described took place during the Cambrian time, and at a later period, perhaps in the Permian, these rocks were folded by lateral compression into a mountain ridge, which has since been reduced by erosion to its present form. During the process of folding, or later, masses of granite were intruded from beneath into the heart of the range, which hardened without reaching the surface. The removal of the upper part of the range by the elements has exposed these in some places both north and south of the railway line. This is the nearest approach to volcanic action in the range itself, but such intrusions, which do not cause eruptions at the surface of the earth are not commonly regarded as properly volcanic. So far as known, there has at no time been a volcano in the Selkirk Range as it now stands.

The above note on Geology of the Selkirk Mountains is in response to an inquiry by The Journal as to whether the Selkirks are of Volcanic origin. It is published for the information of our readers.—Ed.



Photo A. O. Wheeler

ILLUSTRATION No. 1

From View Point 79.3 feet South of Rock No. 1, 1910

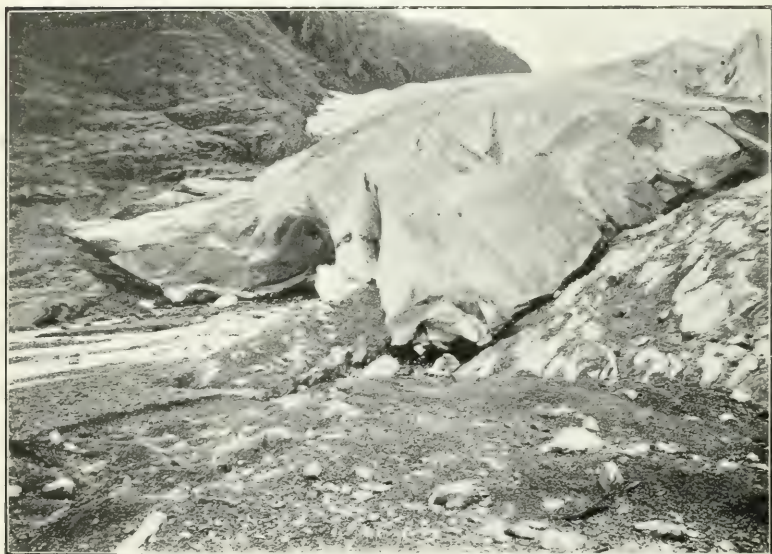


Photo A. O. Wheeler

ILLUSTRATION No. 2

From Rock No. 2, 1910

MOTION OF THE YOHO GLACIER.

BY ARTHUR O. WHEELER.

The annual observations of the Yoho Glacier were made on the 22nd of August, 1910, as compared with the 12th of August, 1909—ten days later. The programme was the same as usual. The day was fine but cloudy and the photographic results fairly satisfactory. This was fortunate, for the same night six inches of snow fell and the weather continued stormy for several days.

RATES OF FLOW.

All the plates set out in line the year before were readily found and angles read upon them at both ends of the base line A—B on the east side of the valley. Upon plotting the results they are found to agree very closely with those of the three preceeding years but more particularly with those for the year 1907-1908. In that year the average daily motion was estimated at 3.12 inches and for 1909-1910 at 3.11 inches. A full table of results since the measurements were inaugurated is here given.

Table Showing the Motion of Plates set on the Yoho Glacier.

Plate	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Movement between July 15th, 1906, and July 17th, 1907.						
Total Motion	29 ft.	74 ft.	89 ft.	124 ft.	134 ft.	124 ft.
Yearly Motion	29 ft.	74 ft.	89 ft.	124 ft.	134 ft.	124 ft.
Daily Motion	0.95 in.	2.43 in.	2.93 in.	4.08 in.	4.41 in.	4.08 in.

Movement between July 17th, 1907, and July 1st, 1908

Total Motion	20 ft.	43 ft.	112 ft.	115 ft.	127 ft.	127 ft.
Yearly Motion	21 ft.	45 ft.	117 ft.	120 ft.	133 ft.	133 ft.
Daily Motion	0.69 in.	1.48 in.	3.85 in.	3.95 in.	4.37 in.	4.37 in.

Movement between July 1st, 1908, and August 12th, 1909.

Total Motion	25 ft.	67 ft.	100 ft.	147 ft.	161 ft.	157 ft.
Yearly Motion	22 ft.	60 ft.	90 ft.	131 ft.	144 ft.	141 ft.
Daily Motion	0.72 in.	1.97 in.	2.96 in.	4.31 in.	4.74 in.	4.62 in.

Movement between August 12th, 1909, and August 22nd, 1910.

Total Motion	23.8 ft.	57.5 ft.	83.8 ft.	126.3 ft.	143.8 ft.	147.3 ft.
Yearly Motion	23.2 ft.	56 ft.	81.6 ft.	122.9 ft.	140 ft.	143.4 ft.
Daily Motion	.76 in.	1.84 in.	2.68 in.	4.04 in.	4.60 in.	4.71 in.

1906-1907, Average daily motion—3.15 inches.

1907-1908, Average daily motion—3.12 inches.

1908-1909, Average daily motion—3.23 inches.

1909-1910, Average daily motion—3.11 inches.

FOR ADVANCE OR RETREAT.

As in previous years measurements were made from Rocks Nos. 1 and 2 on the east side, and from Sherzer Rock on the west side.



Photo A. O. Whesler

ILLUSTRATION No. 3

From View Point $6\frac{1}{2}$ feet nearer Ice than Vaux marks of 1902. 1910



Photo A. O. Whesler

ILLUSTRATION No. 4

From Station D. For position see map of Ice Forefoot, Vol. 1, No. 2, page 274

Table Showing Measurements to Nearest Ice.

Year.	From Rock No. 1 Left side of Stream	From Rock No. 2 Left side of Stream	From Sherzer Rock Right side of Stream
1904.....	79.4 ft.
1906.....	27.5 ft.	36.6 ft.	79.6 ft.
1907.....	35.8 ft.	43.8 ft.	123.0 ft.
1908.....	72.3 ft.	104.4 ft.	138.5 ft.
1909.....	104.2 ft.	139.0 ft.	189.3 ft.
1910.....	167.0 ft.	204.0 ft.	201.0 ft.

Distance from Rock No. 1 to Rock No. 2—53 ft.

1906-1907, Average retreat of ice forefoot—19.6 ft.

1907-1908, Average retreat of ice forefoot—37.5 ft.

1908-1909, Average retreat of ice forefoot—39.0 ft.

1909-1910, Average retreat of ice forefoot—46.5 ft.

It will thus be seen that the Average retreat for the year is the greatest since measurements were inaugurated.

ANNUAL CHANGE IN FORMATION OF ICE FOREFOOT.

A comparison of the views here given, which are identical with those of previous years, show a very perceptible shrinkage of the dry glacier and a marked flattening and round of the forefoot. The general shrinkage of the volume of the ice is made apparent by the increasing amount of the cliffs of Yoho Peak now seen at skyline of views from the same points. Another indication is the very much easier gradients with which the ascent of the ice front can be made and the greater flatness of the upper portion.

Again the forefoot presented a magnificent ice-arch. In fact, it would be difficult to find a finer one.

A general map of the forefoot, made from a photograph survey, will be found in the 1908 issue of the Can-

adian Alpine Club Journal. The back numbers also give views from the same points for each year since the observations were begun.

The Yoho Glacier, like most of the known glaciers of the Canadian Rockies and the Selkirks, is in a stage of retreat; the only reported advance being the Asulkan Glacier, in the Selkirks. A summary of the Fourteenth Annual Report of the International Committee on Glaciers for 1908 and 1909, received through the courtesy of Mr. Harry Fielding Reid, of John Hopkins University, shows this stage of retreat to be generally universal throughout the glaciers of the Alps and of the United States.

OBSERVATIONS ON GLACIERS IN 1910.

BY MARY M. VAUX.

My brother, George Vaux, Jr., was unable to go to the mountains so it was necessary for me to continue the work that had been carried out by my two brothers since the year 1887. Following their methods, glacial observations and measurements for the year 1910 were made on the Illecillewaet and Asulkan Glaciers in the Selkirks, and on the Victoria Glacier in the Rockies. Photographs were taken as usual, and the general conditions noted.

The winter of 1909 and 1910 seems to have been similar to other winters, save that, owing to a warm spell of weather at that time, the snow avalanches were very severe early in the season, coming down into the heavy timber in many places where they had never been known before. The snowfall, however, was but forty feet at Glacier station, according to the records kept at that place.

ILLECILLEWAET GLACIER.

In company with Mr. A. O. Wheeler, who kindly assisted me with the transit and calculations, I visited the Glacier, August 19th, 1910. The whole of the Glacier appeared much flatter than heretofore, this characteristic being very noticeable at the tongue, where the ascent up the face of the ice was by a very easy grade. The brown rocks on the left side and the bed moraine near them were much exposed, the ice having great recessions at this point. The distance from Rock "C" to the nearest ice on this date was 426 feet, thus making the recession for the year 60 feet. The tongue, to which we meas-

ured, was in advance of the main part of the forefoot of the glacier, so that the actual shrinkage appeared to be much greater than the measured distance would indicate.

As the distance from Rock "C" was so great, we chose an auxiliary rock, near the pony trail, as a new point to measure from, in addition to Rock "C." This rock is marked VAUX, 1910, and the distance to the nearest ice from this point was 162 feet.

All the measurement plates that were put on the ice last year were located, but owing to the crevasses that had opened on the left side but seven plates could be used in measuring the rate of flow, the eighth being hidden by great mounds of ice, with deep crevasses between. A table of the motion of the seven plates kindly prepared for me by Mr. Wheeler, is subjoined.

As the surface was so changed by crevasses where the old line of plates was set out, it seemed best to select a new line to place the plates. The first tall tree against the rock wall of Glacier Crest, above the left moraine, was chosen to sight to from the old transit points on the right moraine, and the seven plates visible were moved back to this line, thus placing them in a more favorable position for observation another year.

ASULKAN GLACIER.

This Glacier was visited August 9th, 1910.

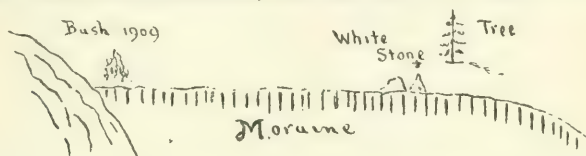
The surface of the ice was much less crevassed than last year, its whole appearance being flatter, and the ice-fall far less striking than usual. The distance from the marked rock to the ice was $202\frac{1}{2}$ feet, thus indicating a recession of $140\frac{1}{2}$ feet for the year. The newly uncovered bed moraine was very striking, and so many changes had occurred about the forefoot that the marked rock was difficult to locate.

VICTORIA GLACIER.

This Glacier was visited July 25th, 1910, and found to be much flatter than heretofore, while a new ice arch was being formed through which the main stream flowed out. The recession was greatest on the right side of the Glacier, though the measurements to the marked rocks did not indicate much actual shrinkage, being only $3\frac{1}{2}$ feet greater than in 1909, when the distance was $151\frac{1}{2}$ feet.

PLATES RE-SET AUGUST 19TH, 1910.

Re-set plates in line with top of pyramidal white stone on crest of moraine, a little to left of bush taken in



1909, as per sketch; was forced to change the position of the initial line owing to change in ice formation on Glacier.

Angles read at S.E. end of Base.

Objects sighted on	Transit readings	Interior angles
N.W. end of Base	360° 00' 180° 00'	Angle between Base and line of plates —77° 50'

Angles read at N.W. end of Base.

S.E. end of Base	360° 00' 180° 00'	Angles between Base and plates.
Plate No. 1	67° 55' 30" 247° 55' 30"	No. 1—67° 55' 30"
Plate No. 2	78° 42' 30" 258° 42' 30"	No. 2—78° 42' 30"
Plate No. 3	86° 04' 30" 266° 04' 30"	No. 3—86° 04' 30"
Plate No. 4	88° 44' 30" 268° 44' 30"	No. 4—88° 44' 30"
Plate No. 5	89° 55' 30" 269° 55' 30"	No. 5—89° 55' 30"
Plate No. 6	90° 39' 30" 270° 39' 30"	No. 6—90° 39' 30"
Plate No. 7	92° 45' 30" 272° 45' 30"	No. 7—92° 45' 30"
Plate No. 8	Could not set plate No. 8	
On white stone moraine	96° 09' 30" 276° 09' 30"	Stone—96° 09' 30"

Table Showing the Motion of Plates on the Illecillewaet Glacier.

Plate	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Movements between September 11, 1909 and August 19, 1910							
Total Motion	43.5 ft.	52 ft.	166.5 ft.	142 ft.	148.5 ft.	152 ft.	144.5 ft.
Yearly Motion	40.8 ft.	48.7 ft.	156 ft.	133 ft.	139.1 ft.	142.4 ft.	135.4 ft.
Daily Motion	1.34 in.	1.60 in.	5.13 in.	4.37 in.	4.57 in.	4.68 in.	4.46 in.

1909-1910 Average daily motion—3.74 inches

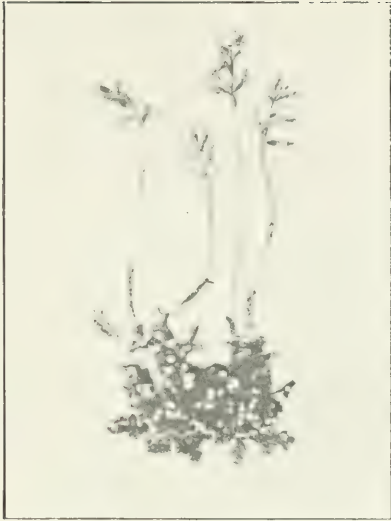


Photo Mary T. S. Schaffer
CORALLORHIZA



Photo Mary T. S. Schaffer
SMELEWSKIA CALYCINA



Photo Mary T. S. Schaffer
CLAYTONIA LANCEOLATA



Photo Mary T. S. Schaffer
CHIMAPHILA UMBELLATA

BOTANICAL NOTES

HAUNTS OF THE WILD FLOWERS OF THE CANADIAN ROCKIES.

(Within reach of the Canadian Pacific Railroad.)

BY MARY T. S. SCHAFFER.

Few are those who climb throughout the Canadian mountains to whom the flowers of the region do not appeal. When twenty years ago there was one botanist searching hills and valleys, to-day there are fifty.

Twenty years ago there was little known of a large number of the varieties, there was no Botany published to cover the ground, to-day one may study with a fair amount of information to hand to do it intelligently.

But what the Botanies do not do is to tell the visitor to our great Rocky Mountain garden of the special haunts and the special times of blooming of these children of the hills. There is a good reason for this apparent lack of valuable information, which all true lovers of flowers recognize without comment on my part, for there are thousands who gather only to throw away, those who in gathering, ruthlessly destroy the roots, and those who are collecting, who pluck till the last rare specimen is in their vasculum. To illustrate: There was a small bed of *epilobium* at Glacier—whose location in a moment of weakness (ignorance really), I betrayed, and as it was about to bloom I would then be able to find out which one it was. In three or four days I went to look for my treasure only to behold the party to whom I had confided my new friend returning with every specimen of the plant in his hand.

I never got a photograph of it, I never found out what one it was, but I learned to keep the haunts of rare plants to myself. If now I break to some extent my hard learned rule and mention some of the localities which contain the rarer blossoms, I trust that those who read will respect the rights of the flowers and not slaughter them.

And now the stranger to the Rockies goes forth for the first time to study the plant-life. Banff is his first stopping-point, and a very good one it is, as spring comes first there. He has read that the *gentiana affinis* is to be found in that locality in August. In faith he goes forth to get it, and most naturally turns to the beautiful Bow Valley. He returns laden with flowers, of course but not with the more or less rare gentian, which loves not the sunny Bow, but the cool shades of the Spray valley. It is a little late, but he might also be so fortunate as to find a few isolated specimens of the *primula maccalliana* and *anemone parviflora* which grow there in profusion in June and early July.

He may do as I have seen others before, search every place but the right one for the *cytherea bulbosa* (calypso) and not find it. This fairest of all the Canadian mountain flowers grows in rankest profusion on Sulphur mountain at Banff, its rosy blossoms showing above the thick mosses at the base of the mountain in early June, and as the season advances, slowly creeping toward tree-line. It is not found around Lake Louise or Glacier but plentiful at Field again. The *moneces albiflora* travels in the wake of the calypso; and the *orchis rotundifolia* another beautiful and rose-colored orchid is found in the same sections of the country as the two previously named plants growing in the river marshes.

Still another interesting plant around Banff in the early spring is the *corallorhiza*. its greenish white blossoms are most insignificant, but gather it by the roots,

wash them gently and the result pays for the trouble. It is very plentiful back of the C.P.R. hotel and through the pine forests. The gorgeous scarlet *lilium montanum* has its haunts of plenty, yet seldom more than isolated specimens are found. In the Bow River valley beneath the rugged cliffs of Tunnel mountain, the ground is dotted with flaming red by the end of June. At Field on the Ootertail road, armloads of the lily may be plucked in a few moments at certain points.

At Banff, on what is locally called the "Cave and Basin" road, may be found the *cypripedium passerinum* (white lady-slipper) in great plenty, while at Emerald Lake, near Field, the *cypripedium parviflorum* blossoms at the same time on the new-made ground at the head of the lake.

Before we leave Banff, I might mention one special point of interest which is for the botanist who is lucky to get into that country in the early spring. It is a small alpine meadow several hundred feet above the main valley, and is in plain sight from the Banff station, on the hills to the north. Here the sun on the warm slopes brings forth the growth earlier than at any other nearby point. The *myosotis alpestris* (forget-me-not) the *delphinium menziesii* (alpine larkspur), are always to be found there, and it is the only place I have ever seen the *lithophragma parviflora* growing. It was above this meadow that I found the rather rare plant *smelowskia calycina*, and but one specimen at that.

Leaving Banff, the student of flowers finds quite a different group of plants in the hills surrounding Lake Louise. It is at this point that he who goes early enough may find the Lyell's larch in bloom. It was a sight well worth the hard trudge which I had through the soft snow one sunny morning in June, when at last I stood surrounded by the *larix lyallii*. Everywhere lay snow almost

two feet deep, the delicate pale green leaves were just unfolding in the hot sun, the sweet odor from the crimson cones filled the air, coaxing thousands of butterflies and bees forth, yet at the lake a thousand feet below there was no such herald of spring.

In the swamp near the hotel the *trollius albiflorus* was showing its snowy blossoms, the *oxycoccus* buds were swelling, the leaves of the *limnorchus fragrans* were three or four inches above the ground, and the tiny rosy buds of the *kalmia microphylla* could be found if one looked sharp enough, but no insects hovered round, spring for the moment was on the mountain-top. But so quickly do the seasons sweep across the land, that in three days more we found a favorite spot, (lovingly called "our garden") aglow with plant-life. This open spot, at the upper end of the lake, is so unfortunate as to be placed within eye-sight of all who pass toward the glacier, and as many countless hundreds pass in the course of the summer, the once prolific "garden" is sadly depleted. It is yet worth a visit from the botanist. It is, however, the slopes beneath the cliffs of Mount Fairview to which he should turn his attention, for it is there that most of that numerous family of the Rockies, the saxifrages, are to be found. We had found a few starved specimens of the *saxifraga cernua* in spots, here they were fine, and pretty much every other recorded saxifrage was there also.

Only one more plant specially associated with Louise will I mention—that is the *arnica louisiana*. I have covered much ground in my search for the flowers of that country, and it is at Louise alone I have ever come across it. So rare is it that I leave it habitat to the searcher to find. Twelve square yards will cover all the home I know it to possess. The flower is a pale lemon yellow, on a short nodding stem, with blue-green leaves, and no sooner did I carry in the first specimens than it was pronounced undescribed variety.

If the hunter of flowers has time for a trip to the Pipestone Pass about thirty miles north of Laggan, he will find himself well repaid, it being a trip he can make to advantage during the months of July and August.

But as we would still take a peep at the flora of Glacier, which is essentially different from that of the eastern slope, no more time or space can be devoted to side-trips. Here the *erythronium grandiflorum* (snow-lily) runs riot over the warm hill-slopes the moment the snow leaves the ground, the *claytonia lanceolata*, the yellow violets and the bees and butterflies making a carnival of welcome for this favorite of the Selkirks. Soon the ground of the forest is covered with the millions of clintonia and creeping raspberry blossoms in the swamp ground, the caltha and trollius spring forth, the flower season of the Selkirks is short, and everything is busy. One day in the height of the flower season I took a ride to the Cougar valley, about seven miles from Glacier. I went to see the caves, at that time just discovered, and found I had discovered more than caves. I had found a valley of rare plants and on that day added many new ones to my list. The best place to begin the search is well toward the caves themselves on the open slopes beneath the rock cliffs. There for the first time I found the *phacelia heterophylla*, the *phacelia sericea* and the *pentstemon pseudohumilis*, and throughout the forests generally the *chimaphila umbellata*.

Easy of access, the Cougar valley is a wonderful botanizing district. So I could go on indefinitely, naming little pockets in the hills where some special treasure is hidden; but once started on this interesting study, the hunter needs no more help. These notes are for the stranger, who once within the gates, is a stranger no longer.

WESTERN DOGWOOD.
(*Cornus Nuttallii*)

BY JULIA W. HENSHAW.

The magnificent *cornus nuttallii* is one of the chief glories of the Western woods, where it flourishes apace, and is found in both shrub and tree form. Glades of these Dogwood saplings which in spring are decked with starry bracts, and in the autumn wear a glowing mantle of rose and gold shaded leaves, illuminate the dark masses of fir and cedar in the primeval forest, while here and there a tree of the same species rises to a height of eighty feet, having a trunk two feet in diameter and ovate, entire, wavy-margined leaves that are petioled and pointed, slightly pubescent on the veins below, and glabrous above, being pale green underneath, and of a rich, dark hue and glossy on the top.

In May and June the Western Dogwood is radiant with huge white, greenish or pinkish bracts, for the capitate flowers are quite insignificant and greenish yellow in colour, while the enormous bracts are extremely conspicuous, being obovate or obcordate in shape, and sometimes emarginate, though more frequently terminating in a tiny dark point, and being invariably strongly parallel-veined.

Very beautiful is the Western Dogwood when in fruit, the smooth channelled stones being enclosed in clusters of vivid scarlet berries, ovoid in form and crowned with a persistent calyx.

These trees are difficult to transplant, but when once successfully rooted in the garden they are decidedly ornamental, both in the flowering and fruiting seasons, recalling Lebrun's famous epigram "*La fleur est un papillon fixé*," their gorgeous wide-blown bracts closely resembling the outspread wings of a butterfly.



WESTERN DOGWOOD. (*Cornus Nuttallii*.)

MISCELLANEOUS SECTION

CONSOLATION VALLEY (ROCKY MTS.). ANNUAL CAMP, 1910.

BY A. C. GALT.

During the hot wave which passed over the prairies in June last, I gave some anxious thought to finding relief in some cooler region, and a friend of mine having informed me of the approaching Camp of the Alpine Club of Canada, I promptly became a member and on July 12th started from Winnipeg, the thermometer ranging between 90° and 100° in the shade.

Stopping over at Banff for a couple of days, I found my spirits rising rapidly as the mercury fell, but still it seemed a difficult task to shake off all the business cares I had left behind me, and I found myself still speculating with anxiety as to what the result would be in the cases of Burne v. Jones, and Jerry v. Robinson, and as to whether, if judgment went against my clients, they would pay the bill.

While in Banff, I took the opportunity of visiting the pretty Club-house, and making the acquaintance of the genial Secretary-Treasurer, who seemed to spend all his time in making members comfortable there, and in giving them useful information about the mountains and the Camp.

Upon reaching Laggan, the jumping-off station for the Camp, I suddenly experienced a complete change of circumstances. Several other members emerged

from different cars, arrayed in climbing costume, which to me was quite new, and their conversation seemed interspersed with all sorts of words which I had never heard before. One would talk with pride of the way in which his boots were purposely constructed for the scree; another expressed some doubt as to whether his lower garments would stand a prolonged glissade; while one of the ladies was anxious to know whether her attire would be fitting in climbing a chimney.

I may say that from this point onward, until camp was over, all business matters, law suits, or other sordid cares, vanished from my mind, and I became *pro tem* nothing but a mountaineer.

In due course we arrived at that most charming resort in the Rockies, Lake Louise, and found the Chalet once more under the charge of Miss Jean Mollison. An hour's climb to the lovely Lakes in the Clouds formed a very pleasant introduction to the recreation we all had in view.

The Camp was fixed to open on July 19th, but as I was curious to observe how such a camp was formed, I determined to arrive the day before the opening. The road from the Chalet through the Valley of the Ten Peaks is full of enchantment and surprises, new and majestic mountains appearing at almost every turn, until at length the magnificent panorama of the Ten Peaks lies spread out before one.

On reaching Moraine Lake we had to leave the carriages and hit the trail for Consolation Valley. From the very start this trail is replete with wonderful natural curiosities. The river which flows out of Moraine Lake has to force its way under a mass of enormous blocks of stone, which in some distant age must have fallen from the adjacent mountains. On the right a huge turret of rock, called the Tower of Babel, looms up, and a few yards farther on Mt. Babel



Photo Byron Harmon

CONSOLATION VALLEY
Where the Club Camp of 1910 was held



Photo Byron Harmon

AROUND THE CAMP FIRE, CONSOLATION VALLEY CAMP

itself appears, extending its crest far above the Tower and right into the clouds.

The ground on both sides of the trail was studded with the loveliest Alpine flowers in great profusion.

An hour's tramp brought us in sight of the Camp, which was in process of erection. To reach it, we had to cross an icy stream flowing out of Consolation Lake, on an improvised bridge connecting several large rocks in the stream. Mr. Wheeler, the President, came forward to welcome us, and it immediately became apparent that work was the order of the day. Several tents were already up, but we were told that these all had to be "brushed" before the following night. It is needless to explain to any experienced camper-out what brushing means, but it is quite another thing to do it satisfactorily. I rather prided myself on having at least some little knowledge of how this work should be done. I went to work vigorously, but notwithstanding all my efforts, I found that I was completely out classed by a wiry little man, of sunny temperament, who managed to accomplish twice as much as I could in the same length of time, and without any apparent need of rest. Upon inquiry, I found that this tireless individual was Dr. Longstaff, one of the most noted mountain climbers in the world.

After an excellent supper, the few members present sat around the camp-fire and swapped yarns until it was time to turn in.

Next morning I was awakened by what seemed to be crashes of thunder in the near vicinity, and yet the day appeared to be clear. Upon going out of my tent to see what was going on, I found that avalanches from the neighboring mountains were commencing to fall and the whole scene in front of the Camp was magnificent beyond description. Immediately in front was Mt. Babel, extending up perpendicularly to an altitude

of over 10,000 ft. To the left of it, Mt. Quadra, Mt. Fay, and Mt. Bident, all clad in snow apparently from base to summit, glistened in the morning sun, while glaciers from each of them protruded over the cliffs on the edge of the valley, and huge masses of snow and ice, loosened by the warm rays of the sun, would from time to time be discharged as avalanches.

The Camp itself was pitched in a well-wooded grove. Behind us rose a hill which appeared to be of no great height, as it was not snow-capped, but it was only small in comparison to the giants in front of us, for a party which started for an hour's ramble to the top of it found that it required three hours' hard climbing to reach the top.

The arrangements made by Mr. Wheeler and his staff for the comfort of the members were simply perfect. The kitchen was, as usual, in charge of the Club's old friend, Jim Pong. Breakfast began at 5 a.m. (for "long distance" climbers), and lasted till 10 a.m. for the others. Campers' fare was the order of the day, and everything was of the best quality and excellently cooked.

On the opening day of the Camp members kept pouring in, so that we must have had about one hundred in camp that night.

Owing to a difficulty with one of my eyes, I did not think of doing any strenuous mountain climbing, but rather intended to take advantage of the numerous minor expeditions through the neighboring valleys and passes and to the various beautiful lakes in the vicinity.

The ignorance of newcomers respecting the lingo of the mountains sometimes occasions embarrassment. As I sat smoking my pipe by the fire, a couple of Swiss guides were comparing notes on their preparatory examination of the mountains that afternoon, and were

talking about Mt. Fay. Presently I caught the following remark: "It turned out to be not quite so large as I expected. Still, the forefoot extended down the valley about eighty yards and the snout was about fifteen feet." "Heavens alive!" thought I, "what kind of monster can this be, of such prodigious size?" I knew that there were some celebrated fossil beds near Mt. Stephen but I had no idea that monsters of such size as the guides were talking about had ever existed in the world. Not wishing, of course, to appear too much surprised, I remarked to one of them, "What's that you were speaking of? A fossil?" The guide looked around at me with a rather dubious expression on his face, and said, "No fosseel at all; solid ice." "Oh," said I to myself, "I have it now." I recalled the accounts of mammoths found away up in the Yukon and in Siberia, embedded in solid ice, where they must have lain entombed for perhaps thousands of years, and yet their bodies were preserved intact. But a monster of such gigantic size as above indicated was indeed a find. I determined to join the very first party scheduled for Mt. Fay, and hurried off to put down my name on the bulletin board.

Feeling very much interested in what promised to be one of the greatest discoveries of science, I rejoined my friends at the fire, and found by this time that the other guide was describing the situation on Mt. Bident. "What do you think of our chances tomorrow?" "Well," was the rejoinder, "I had a long pull around the left shoulder for several hours, with no very great difficulty until I got more than half-way up, when I caught sight of a bergschrund. It looked ugly. I would not care to face it alone, but possibly three or four of us with a rope might tackle it successfully."

I thought I was fairly well acquainted with the names of wild animals that might be expected in the mountains, but I had never before heard of this one, and had no desire to make his acquaintance. You see, the Government had prohibited the use of fire-arms throughout this part of the Rocky Mountains, and I felt that perhaps I might be a little in the way when the brute was being lassoed. But having put my name down for Mt. Fay, I hazarded the remark, "Any bergschrunds on Mt Fay?" "Yes, indeed," said the guide, "a bigger and worse one than what I saw on Bident."

This was enough for me; I remembered my first determination not to try the mountains too hurriedly, so I concluded that I would wait until these horrible brutes had been successfully captured and brought into camp, before I would attempt either mountain. I therefore quietly slipped away and erased my name from the bulletin board, and turned in for the night, not altogether satisfied with the outlook.

Next morning at daybreak the President crept into the tent and roused the Rev. Mr. Wallace, who had put down his name for Mt. Bident. I must confess to having felt somewhat guilty in allowing an unsuspecting stranger to attempt a very dangerous task, but I remembered that my tent-mate was a contributor to "Rod and Gun", and thought he might resent any suggestions of inability to cope with big game.

After breakfast I concluded to take the Secretary into my confidence, and found him busily engaged in the official tent. After I had outlined to him the incident with the guides the night before, he smiled quizzically, and taking up the first volume of the Alpine Club Journal, he turned to the glossary of mountain terms and said, "I think a perusal of a few pages of this will assist you in understanding the language of the guides." I hastily ran down the list of terms



Photo Byron Harmon

A WELL-EARNED REST



Photo Byron Harmon

"DISTURBED BY THE CRASH OF AN AVALANCHE"

and their definitions, and having twice read over the definitions of "forefoot", "snout" and "bergschrund", I thanked the Secretary for his assistance, and requested that he would regard our interview as confidential.

The Club rules compel all ladies who attempt the mountains to forego the pleasure of their skirts, and to robe themselves in knickerbockers and puttees, like the men. But both alike exhibit great diversities of taste, just as in more civilized surroundings. Some people, when inspecting a house, confine all their attention to the first floor, and delight in observing everything to be seen in the drawing-room, dining-room, library, and even kitchen. Others investigate the cellar, and insist upon penetrating to the garret, and even getting out on to the roof. So it is in mountaineering. Many prefer the charms of the ground floor, so to speak, with its wonderful variety of Alpine flowers, shady groves, turbulent streams, rocky defiles, and other attractions of the valleys. The larger number, however, seem bent upon reaching the summit, and some (of whom Dr. Hickson is a noted example), not content with getting out upon the roof, will even climb an insecure "chimney" in order to attain the very pinnacle.

The delightful experiences of the daytime were supplemented and varied every night at the camp-fire. Amongst the ladies were Mrs. Pat Burns, of Calgary, the official chaperon of the ladies; Mrs. Henshaw, of Vancouver, the celebrated authority and writer on Alpine flowers; Miss Longstaff, sister of the Doctor, and, like him, an enthusiastic climber; Miss Chevrier, who immortalized "The St. Boniface Fire Brigade"; Miss Durham the newspaper correspondent; and many others. Among the gentlemen, Dr. Longstaff, Rev. G. B. Kinney, Mr. Geoffrey E. Howard, and Mr. C. G. Arthur, were always ready to fill in gaps that might occur between the choruses which enlivened the party.

But it must not be supposed that any set plan was adopted or followed, and nobody was ever forced into the ring for the purpose of entertaining the group. Dr. Longstaff's experiences in mountaineering and with big game were extremely interesting.

We also had several experienced mountaineers, who said very little, but did a great deal to make the Camp a success. Among these were the Vice-President (J. D. Patterson), Oliver Wheeler, Dr. Fred Bell, and the Rev. A. M. Gordon. Besides these, we had several American members amongst whom were F. W. Freeborn, Mr. B. F. Seaver and Miss Vaux.

Consolation Valley itself is 6,000 feet above the sea. The lake and stream in front of the Camp take their origin from the snow-fields and glaciers in the immediate vicinity. It was, therefore, a great surprise to find that there was good trout-fishing in the lake and stream. One afternoon over 100 speckled beauties were brought into camp by a few members. How these fish ever reached such an altitude without wings is a mystery to me.

The variety of exquisite Alpine flowers even at that high altitude was shown by one of our members, who gathered 42 different varieties one afternoon.

I adhered to my non-climbing determination until almost the last day of the camp, but I found it impossible to resist at least an attempt to become an active member of the Club. The official climb fixed by the President for our party was Mt. Eiffel. Start-from camp in the afternoon, we reached a subsidiary camp in Larch Valley, where we were joined by a party scheduled for Mt. Temple. Supper began about sundown, and what a delightful repast it was for hungry and thirsty amateurs with appetites whetted by two hours' climb. Amongst the party were Miss Bell, of Winnipeg; Miss Pearce, of Calgary; Mr. Byron

Harmon, of Banff; and Mr. Kinney, the hero of Mt. Robson. Next morning an early start was made. The weather was perfect, and the scenery magnificent. On the south were the Ten Peaks, in all their glory; on the west Mts. Eiffel and Pinnacle; and on the north Mt. Temple. The ascent of Mt. Eiffel was not really difficult at any stage, although laborious in places. Shortly before noon, clouds began to gather on the summit, so that when we reached the top, we could not even see down into Paradise Valley.

Upon reaching camp, it occurred to me that a glass of whiskey-and-water might prove beneficial, so I appealed to one of my tent-mates, and he produced a flask which he had not found occasion to open during the whole time we had been in camp. Neither of us had seen or missed any drink stronger than tea since we had come to camp.

The influence of the mountains, as exhibited by every member of the Club I met was singularly instructive. An incident which occurred that evening will illustrate my meaning. A small party had been out on a two-days' excursion, which necessitated the packing of their blankets and all other material for camping out at night. I had just completed a refreshing wash, and was ready for supper, when this party tramped wearily with their packs on their backs, into camp. I went forward to greet them, and the foremost of the party said to me, "Look here, have you yet made your official climb?" I said, "Yes, I did to-day." He said, "Let me congratulate you. My sister and I had determined that if you had not yet made your climb, we would insist on your doing so to-morrow, and would take you up any mountain you choose."

There are very few popular sports and exercises which I have not taken a shot at: football, lacrosse, rowing, cricket and tennis; but I must confess that for

real pleasure and benefit, mental and physical, mountaineering beats them all. A cricket match rarely lasts six hours of the day, and none of the other sports I have mentioned take as long. And it is not possible for those taking part in these exercises to exchange ideas to any great extent. The ascent of a mountain, on the other hand, with a few friends and an intelligent guide, commences at daybreak, and often lasts till after dark. During all that time the scenery is full of delightful surprises, the exercise is exhilarating, and the opportunities for what I have termed "exchange of ideas" are innumerable. The rule of mountaineering is "Never hurry unless you have to." At times the exertion is considerable, but I know of no pleasanter feeling than, after a day's outing, to return to camp physically tired. The satisfaction of a good, square meal (such as the Alpine Club of Canada always puts up), followed by a long pipe at the camp-fire, and ending up with a comfortable bed of balsam boughs, is something which cannot be described, but must be experienced. In a word, and from the standpoint of recreation, to compare other sports with mountaineering is to compare a hasty meal at a lunch-counter with a leisurely dinner among friends.

At the commencement of this article I was an inexperienced novice; at the close I find myself an active member, fully able to appreciate the following beautiful sentiments:

"The mountain cheer, the frosty skies,
Breed purer wits, inventive eyes;
And then the moral of the place
Hints summits of heroic grace.
Men in these crags a fastness find
To fight corruption of the mind,
The insanity of towns to stem,
With simpleness for stratagem."

THE UPPER COLUMBIA.

BY ELIZABETH PARKER.

Whittier's familiar couplet might have been written of this mighty river that encompasses the snowy Selkirks and winds the length of its long chain well-nigh 1,400 miles to the sea. Watching its tumultuous yellow waves from the railway train, the traveller may not know that for fully twenty miles from its fountain-head in the Columbia Lake 100 miles south, its waters are clear as crystal. The Columbia is a famous river in a Province of famous rivers. It is the largest and longest of the great waterways in North America emptying into the Pacific Ocean, half of its sinuous length being in Canada. It drains an area of 298,000 square miles. The tourist who makes the inland voyage, by steamer or canoe, from Golden at its confluence with the Kicking Horse to Windermere, companies with only a small portion of the old river. Nevertheless, this portion which flows through a rich and lovely valley must once have been many miles wide—as wide as the distance between the Selkirks and the Rockies stretching on either side. For you may watch the river carrying down soil. The grade here is less than a foot to a mile, and its continuous abrupt winding for forty miles and more south gives the voyager an impression of sailing over a long series of lagoons.

In places the valley is ten miles wide, and its fine white loam is exceedingly rich, requiring only water to produce anything that will grow in the temperate zone. Although there is an excellent picturesque road that often rises to skirt the foothills, the happiest way to travel to the Windermere District is by the river. The

passenger boat, Klahowya, leaves Golden, during the summer, at 7 a.m., on Tuesday, Thursday and Saturday. The summer weather is always clear and sunny, once you are well within the southern reaches of the Valley. Ever on the west side, the richly wooded ranges of the Selkirks softly fold and unfold. "O, those mountains, their infinite movement still moving with you." Ever on the east, the treeless upper parts of the Rockies take on in strong sunshine, indescribable hues, between crystal and pale sapphire. No definite words, compact of colour, as rose or purple, can give any concrete and accurate idea of their appearance on a glorious morning of sunlight. Under a sky of deep cerulean blue, the sun seems to touch the rock with the transparency of a faint blue gem. In the afternoon and evening, their colours are definite rose and violet, all their sharp contours softening as the day wanes; while the recesses of the Selkirks are filled with an intensity of blue that deepens in the gloaming.

Very few of the peaks are named and those named not likely submitted to the Geographic Board. Mt. Manitoba, named for his own province by Sir John Schultz, stands up conspicuously in the Rockies; and, in the Selkirks, Mt. Ethelbert named by Captain Armstrong for the first nun to ascend the river. She died on board the Captain's boat, Ptarmigan and was buried as Sister Ethelbert. The Government maps mark a mountain in the Selkirks about forty miles from Golden by the river, as Jubilee Mountain, probably named in the year of Queen Victoria's Diamond Jubilee.

The valley itself is now lowland, colloquially "river-bottom" covered with low-growing shrubbery and deciduous trees, and now high benches studded with large firs, naturally terraced parks—receding to the base of the mountains. Occasionally a farm slopes to the river's margin, but mostly the cultivated farms lie unseen from

the steamer. On a bench 150 feet high that borders the river, is a flagstaff erected by a farmer who first unfurled the Union Jack for the victory of Mafeking. It is one of the river's landmarks.

This part of the great river is now comparatively idle waterway, but in a few years it will not be so, though its craft will be employed in pleasure rather than in pure commerce. For the speedier railway, soon to connect the Kicking Horse and Crow's Nest Passes, will carry the ore and the cattle and all the merchandise of trade created by a people who will live in comfort or wealth and die in the Valley. Though the bottles of heaven are stopped for two months and more every summer, irrigation will make the dry benches and intervalles rejoice and blossom as the rose.

An occasional motor boat is now seen where fleets of this modern pleasure craft will soon be familiar. And always, as hitherto, the river will be the happy waterway of the canoeist.

It is from glacial Toby Creek just below the lake called Windermere that the river receives its first soiling. Windermere is as limpid a water as flows in Canada, and shallow along its margin, making safe and excellent bathing. No one has yet been drowned in its waters. Canterbury Point, on the western shore of the lake, has been often pointed out as the sight of Thompson's Fort 1807-11, there being wooden ruins attesting some old habitation. But Thompson's Fort, called by him Kootenae House, was undoubtedly situated north of Toby Creek near its mouth where it is marked on his remarkable map made two years later. The warehouse, says Thompson's biographer, was built on the low land by the Columbia river and the dwelling house was farther back on the higher terrace. This would settle any controversy. On June 22, 1807, when he had discovered Howse Pass, Thompson records concerning a "rill" there: "May God

in his mercy give me to see where its waters flow into the ocean and return in safety." The rill was Blaeberry Creek. Reaching the Columbia, why did Thompson go up-stream? Miss A. C. Laut, the historian, discerns the reason. If he goes down stream, which is north, he knows from what the Indians say that he will come to a long detour (the Big Bend); but he is in a hurry, and it seems to him that he will reach the Ocean sooner "Where American Traders are heading," if he ascends the river. This is how Thompson discovered Lake Windermere; and two years later the river's source in Columbia twenty miles south, also the Upper Kootenay which, by a trick of Nature, flows south for many miles in a line with the Columbia flowing north.

Though discoverer and fur-trader, Thompson was no free-lance in adventure, but a sober, religious Welshman. Such involuntary devout expressions as "Please Heaven," "Thank God," abound in his diaries. And at least one entry betokens the stern disciplinarian: "Voyageur Martin insolent—dislocated my right thumb in thrashing him."

Thompson never received recognition for services of exploration as great and more valuable than those of Sir Alexander MacKenzie who first navigated the MacKenzie River to the Arctic Ocean and first traversed the Rockies to Northern Pacific waters. He was, says Mr. J. B. Tyrell, who is preparing the first biography of this pathfinder of the Selkirks, the greatest land geographer the British race has produced. And his career, from a Charity School in London to an obscure death at the great age of eighty-seven in a village near Montreal, is one of the most remarkable and romantic in the annals of the great geographers. He entered the service of the Hudson's Bay Company in 1789, exploring and surveying the Nelson, Churchill, Athabasca, Peace and Saskatchewan Rivers. In 1797 he went over to its great

rival, the North-West Fur Company as geographer and astronomer, and in 1800 first entered the Rocky Mountains in latitude 51° probably near the Pass followed by the C. P. Railway. Thompson discovered the source of the Mississippi in 1814. In 1816 he was appointed by the British Government astronomer and surveyor to define the boundary line between British North America and the United States. Nine years were occupied in this international survey, and the maps then made are still and will always be the ultimate authority on the line dividing the two nations from the State of Maine to the north-west angle of Lake of the Woods. Thompson married a "Child of the Western Country."

Thus, before 1807, the history of the Upper Columbia and Kootenay regions belongs to the Indian and comes down in legends of intertribal wars. A great battle fought centuries ago between the Kootenays and Blackfeet, is recorded in aboriginal hieroglyphics of red pigment on an outstanding rock near the shore of the Columbia Lake, twenty miles south of Thompson's fort. An ancient footpath, the Spirit Trail of the Indians, leads beyond this and kindred pictured rocks three miles away. Near the trail are mounds built up of leaf mould and twigs, altars where to this day the Indian passing along, lays a tiny branch, his offering to the Great Spirit. He would be an unwise and unworthy Christian who tried to dissuade him from the custom.

From 1807 to 1811, the year of Thompson's last visit, the white man lightly touches the history of this country. It reverts to the Indian again until 1864 when Dr. Toby came, and gave his name to the brook flowing down the wild and beautiful canyon, only now becoming known to the world outside.

After Dr. Toby came miners, whisky pedlars, the North-West Mounted Police and a few ranchers. Windermere was built on a terrace overlooking the lake.

for many years the considerable village of the district and a stopping-place for travel between Golden and Cranbrook. Athalmer by Toby Creek and Wilmer in the high park lands two miles or so from the river, make three centres for expeditions in the valley. On the western side of Lake Windermere, old Canterbury Point has been surveyed, divided into spacious residential lots and given the new name Invermere. A commodious hotel has been built there; and before many years it will be a place of country-houses for persons from nearly every city in Canada. A house boat with a capacity for twenty guests is stationed at Athalmer.

Toby Creek Valley, rich in minerals and known to prospectors and hunters for over thirty years, was discovered to Canada as a play-ground by the Governor-General, Earl Grey, in 1908, when His Excellency entered the Canyon from Earl Grey Pass. The next year he camped near the head of the Canyon hard by Toby Glacier. Now we are to know that the whole country, while rich in agriculture, minerals, fish and game, big and little, lies *close against* an extensive virgin alpine region. Could diversity further go? The only limitation in the Happy Valley is the white dust which in summer drought, rises from its roads with every puff of wind and every step of man and beast. But dwellers there and lovers of that fascinating country are gaily impervious to its discomfort. Besides, it is absolutely free from microbes. It is rare to die in the Happy Valley, save from old age or accident. Obviously there is no dust to speak of in the upper parts of the tributary valleys.

Toby Creek valley runs into the hills for forty miles. Its picturesque road, thirty miles long, winding through close forest and rich underwood, may follow close by or close above the turbulent little river. It is as wild and lovely mountain landscape as ever was seen from any forest road; and no better road runs through landscape

as wild and lovely. Twenty miles from Wilmer is Pinehurst, a cluster of frame and log houses, where a tributary stream joins Toby Creek. Here is a branch road ascending Spring Creek to Paradise Mine, 8,000 feet above sea. In letters, though not in science, you might call Spring Creek (I detest the word for running water) Canyon a hanging valley of lavish forests. A lonely glen high in the depression of high hills, the road, wide enough for motors to pass, climbs for ten miles with changing views of snowy mountains at its every sharp curve or round corner. There is no dust; and it leads to the edge of a turfy meadow where the brave larches grow—the most lovable of all beautiful trees growing in high altitudes—and where lie snowbanks that are the fountain-head of Spring Creek. Here, Nature herself invites the Alpine Club of Canada to meet. A ridge, perhaps 1,000 feet above the meadow, commands an expansive outlook over a confusion of glaciers and rock-summits, every grey peak transmuted to faint sapphire among the white, white snows. It is quite true that the secret and most potent charm of mountaineering lies in the sights to be seen as one climbs from height to height. In the Rockies knowing ones can from this ridge discern Mts. Assiniboine, Temple, Lefroy, Goodsir and many a separate peak; in the nearer Selkirks, Mts. Dawson, Sir Donald and others in the well climbed districts. Immediately opposite the ridge stands Mt. Hammond (12,125 ft.) first climbed by Mr. C. D. Ellis in 1910. This is no doubt the high mountain which Thompson named Nelson, the outstanding summit in its vicinity.

Six miles from Pinehurst, Toby Creek receives an important tributary, Little North Fork, six miles long, which herself has a notable little tributary, Delphine Creek, issuing from Tilbury Glacier. A bridle trail leads to the Glacier's tongue where the altitude reaches nearly 9,500 feet. This is the only glacier named among seven

flowing from the mountains which form a fine cirque at the head of Little North Fork Valley. There are altogether eight conspicuous peaks in the range which is shaped like a horseshoe. The appellation to suit is obvious—a nail for each peak. In this valley are the “Elysian Soda Springs” which prophesy a flourishing hydropathic when the fame of the country spreads abroad.

Toby Creek road ends at Earl Grey’s Camp near the head of the valley, its outlook including nearly the entire combination of alpine beauty that can be seen from mountain valleys. Sir Leslie Stephen, who spoke from his heart, has very pertinently pointed out that to know the full significance of the term, alpine beauty, one must climb high mountains. From the camp a bridle-trail leads across the Divide, Earl Grey Pass (altitude 7,404 feet), and down Hamill Creek to Argenta, twenty-five miles away. Mr. E. W. Harden, of Boston, paying a glowing tribute to this new mountaineering field, describes the outlook from Earl Grey Pass: “From east to south-west we saw a sweep of unnamed, unclimbed summits hardly to be surpassed in Switzerland, suggesting features of the Monte Rosa—Lyksamm—Breithorn view from the Gorner Grat and of the Jungfrau group from the Scheidegg. To the east was the broad expanse of the Toby Glacier, to the south-east the towering peaks we had already seen from which the glacier sweeps, and to the south one of the noblest mountains, bearing some of the most beautiful and pure glaciers that I have ever seen.”

A second beautiful tributary of the Columbia is one with the unbeautiful appellation Horse Thief Creek, running south of Toby Creek. Between them is that group of glacier-bearing mountains, mostly unnamed and unclimbed, of which Mt. Hammond is one. Horse Thief Creek rises in Starbird Glacier, far back in the mountains

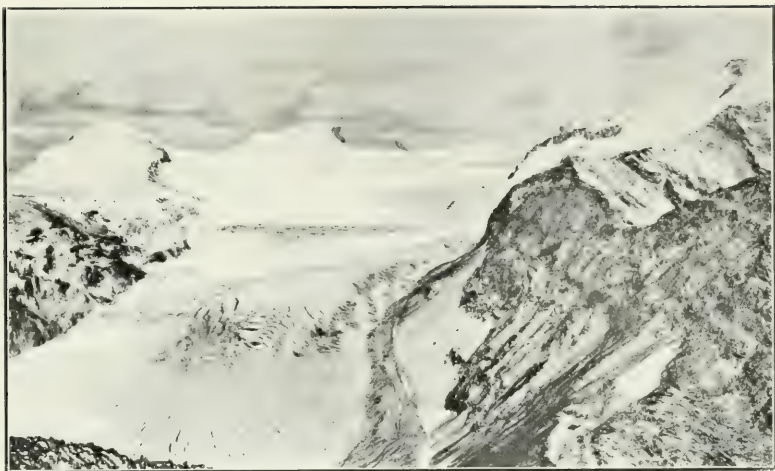


Photo E. W. Harnden

TOBY GLACIER FROM EARL GREY PASS



Photo E. W. Harnden

EARL GREY PASS
Looking towards Hamill Creek

named for its discoverer. This glacier, which has an interesting medial moraine, offers attractions in glacial research to the geologist. About midway up the valley, McDonald Creek flows down from its source in McDonald Glacier at 7,500 feet of altitude where are silver mines to which a waggon road runs. Hard by stands Mt. Farnham, a giant of some possible 12,000 ft. The glacier joins the Tilbury Glacier at the head of the Little North Fork of Toby Creek. Here is exercise on both ice and rock for those seeking new peaks and passes to conquer. The col itself is said to be over 10,000 ft. high. An attractive aspect is their accessibility by an excellent road.

On Horse Thief Creek, just where it emerges from the mountains, is Mountain Valley Ranch, a holiday resort in keeping with the country, owned and managed by Thomas Starbird. The farm-house has developed into a large and comfortable inn with modern conveniences, where guests are welcome in all seasons. Fishing, riding, shooting and mountain climbing are the chief sports. Guests who prefer it may live in cottages or tents. The good driving roads will enhance the attractions of this place for elderly people like this writer and lover of the Happy Valley. There are other tributary glens north on the Selkirk side, where ranching and the noble sports are friendly rivals. Mr. Ellis, the conqueror of Mt. Hammond, is himself a rancher in the hills.

Mr. Ellis tells how, from a peak in the district below Horse Thief Creek, he counted twenty-seven good-sized lakes behind the Steamboat Range. This is a new story in the topography of the Selkirks, its lack of mountain tarns hitherto contrasting with the Rockies.

North of Windermere village the best known spot on the Rocky Mountains side of the Columbia is Fairmont, long locally known as Brewer's stopping-place, where are the hot sulphur springs whose refreshing waters compensate for thirteen miles of dust in the dry

season. These thirteen miles measure the interesting road connecting the two places. The inn, which has its own associations of the Happy Valley ere commerce and the big world invaded, is situated in a fair ground. None fairer did I ever see. It ought to be a stone castle with house-parties for riding and climbing, for the fishing and the shooting and the ski-ing; with a retinue of agrarian retainers. It is situated on the Foothills, a clear pebbly streamlet flowing by the door; the narrowing valley of the Columbia lies in front; and beyond are the Selkirks, sombre with the dark soft forests. The road passing by the door which is the highway to Cranbrook, seventy miles south, branches off towards Columbia Lake a few miles away. Leaving the road you ride at random through the land which is park-land, and any knowing, reliable pony will carry you to the lofty margin of the lake. Who would not like to read the record of Thompson's emotions when he saw this lake, nine miles long, and knew he had found the source of the river. Did he then realize the length and great turnings of the mighty waterway whose first white companion he was from its fountain-head to its confluence with Ocean? If you read the history of the river and company with it by sun and stars for scarcely 100 miles, you have strange feelings not unmingled with wonder and melancholy, when you come to its source. Dwellers in the Happy Valley strike their roots deep and love their river and mountains as they love the flag.

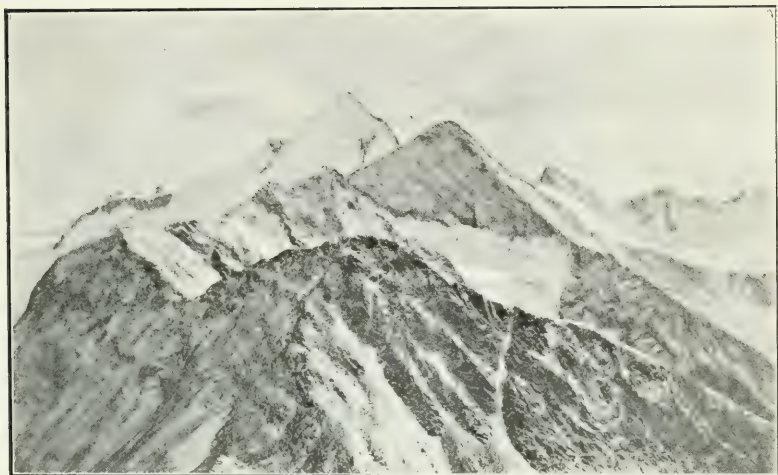


Photo E. W. Harnden

MOUNTAINS BETWEEN HEADS OF TOBY CREEK
And Hamill Creek Valleys



Photo E. W. Harnden

MOUNTAIN AND GLACIER
At head of Hamill Creek

UP THE BOW AND DOWN THE YOHO.

BY B. S. DARLING.

When the Director called upon me for an account of the pleasant August days we spent last summer north of the Great Divide, I fear I did not answer with the cheerfulness of Balaustion:

“ Oh so glad
To tell you of the adventure.”

The *furor scribendi*, which, according to Mummery, sooner or later attacks the mountaineer, has never very seriously infected me. I much prefer to see it prevalent in others. However, having once beheld an unhappy wight ejected from the cook-tent at Lake O'Hara, I know better than disobey orders; so I purchased some foolscap and set to meditating the while on how infinitely less arduous it is to climb mountains than describe them.

Our expedition originated in the coming of Dr. Longstaff, of whose explorations in Garhwal and Kumaon we had already heard from Mr. Mumm and his delightful book. Naturally, the Club gave its heartiest welcome to so fine a sportsman and so keen a mountaineer; and to afford him a glimpse of the mountains north of the Divide. Mr. Wheeler organized an expedition to Bow Lake, thence across the range to the Yoho Valley, and so out to Field.

Our party assembled at Lake Louise after the close of the Consolation Valley camp. The Doctor had unfortunately broken a finger a few days before, but in spite of his ill fortune, his keenness and cheery spirits were in no wise abated; and after a day or so of rest

at a charming camp alongside the Bow about half a mile below the Laggan bridge, he declared himself ready for the trail.

On the morning of Tuesday, the 2nd August, we set out. There were thirteen of us—Dr. Longstaff, Miss Longstaff, Miss Vaux, Mr. Wheeler, Oliver Wheeler, Ballentine, Harmon, Worsfold and myself, with Charlie Logan and his henchman Joe to look after our ten ponies, and Konrad Kain as chief guide and general handy man. The ladies, the Doctor, and the packers were mounted, and the rest of us travelled afoot.

A transcontinental train was at the station as we filed past and our cortege seemed to afford its passengers as much astonishment and speculation as did the arrival of Tartarin in the lobby of the Rigi-Kulm. Miss Vaux, in buckskin shirt and knickerbockers, went over to the office to post a letter, and was snap-shotted without mercy, while the rest of us circled round the east end of the platform. The Doctor, with his arm in a sling fashioned from an enormous scarlet bandanna and mounted on a wicked-eyed cayuse, was easily the most conspicuous figure in the cavalcade. Whether the train-load of tourists took us for a band of hold-up men I do not know, but certainly that flaming bandanna savoured strongly of buccaneering and the jolly Roger. Charlie Logan and an earnest flow of most unparliamentary language brought up the rear. Thrice in the first half mile he had readjusted a certain perverse pack, but once again it had a bad list to port and threatened at any moment to capsize. However, a fourth attempt gave better results, and the atmosphere cleared considerably.

Shortly after leaving the railway, we entered the waste of burnt timber which separates the upper from the main valley. We found the trail mercifully free from obstacles, and by noon were five or six miles on our way. The weather had kindly veiled the sun with light clouds



Photo B. S. Darling

AROUND BOW LAKE



Photo B. S. Darling

BOW LAKE AND GLACIERS



Photo B. S. Darling

NORTH END OF BOW LAKE

during our passage through the brule, but by the time lunch was over the sky had cleared and we continued on our way in brilliant sunshine. Behind us the noble mountains south of the Divide were dappled with sun and shadow, and above them, stately cumuli were rising slowly—great sky mountains, with their slopes and benches golden-tinted by the afternoon sunlight.

At the skirts of the burnt woods we lost the trail. Before stretched a lovely open country, dotted with clumps of trees, across which it seemed inevitable that the trail should lead; but as this pleasant meadowly-looking land is generally a slough of despond, with a notorious reputation for absorbing pack-horses, the trail very naturally swerves to the right, where trees grow thickly for a space and a firmer soil. We entirely missed the turning-point, so were forced to strike straight ahead through the last of the fallen timber and over splashy swamp-land. Fortunately, the summer had been dry; and after cautiously navigating the horses through the downfalls, we found fairly good going beyond and led by Mr. Wheeler, were shortly upon the trail again.

Ahead, the gently-sloping valley extended in a loveliness little to be imagined by those who have only seen it from across the dreary barricade of fire-swept timber which so jealously guards its entrance. Already the evening shadows were beginning to spread from the western barriers across its sunny floor, and the farther we advanced the more did its unforeseen loveliness increase; so that only the passing of the light and a growing hunger reconciled me when the halt for camp was called.

It was pitched in a glade of balsam and spruce near where the outlet from Lake Hector joins the Bow. The waters of the lake were hidden from us by a strip of woodland but we could see the break in the great retaining walls of the Waputik snowfields through which the Balfour Glacier pours down.

Without delay the work of making camp was begun. The ponies were freed from their burdens and allowed to wander away to pasture; the saddles, ropes and blankets were piled around the trunk of a protecting tree; and while the commissariat department was lighting the fire, suspending kettles, and laying out the evening meal, the others were busy with the tents. Poles and pegs and balsam boughs were soon cut from the surrounding trees; and before the twilight had merged into darkness the tents were up and the kettles bubbling.

Miss Vaux, in some magical way, had managed to conjure from the wilderness two fat and tender turkeys, one of which formed the *pièce de résistance* of that evening's sumptuous feast. I have a suspicion that before leaving Lake Louise she had cajoled Miss Mollison and obtained entry to the Chalet's larder; but whatever the *modus operandi*—sorcery, blandishment or barter—we were far too hungry to inquire. We just rejoiced and fell to.

When the meal was over and the dishes put away in the cook boxes, we built up a great crackling fire and gathered round its cheery flames. The tobacconalians got their pipes aglowing; the stars came out overhead; stories began to circulate; and everyone was soon in that blissful state of content, which at such times, comes to the wilderness traveller satisfied with his day and his dinner.

Next morning the camp waked to the tinkle of the bell-mare's bell as Joe drove in the ponies. The weather was divine, the sky a cloudless blue, and the air buoyant with sunny coolness. Harmon and I, in seach of photographs and the hope of getting a glimpse of Hector Lake, set out ahead of the others.

The trail, crossing alternately mossy swamp lands, gravelly bars, and shadowy woods, still kept closely to the Bow, whose milky-green current ran so



Photo B. S. Darling

WAPUTIK PEAKS



Photo B. S. Darling

UPPER BOW VALLEY

swift and strong that we had to abandon our idea of fording the stream and penetrating the screen of woods, which hid us from the lake. However, the day was too glorious and the valley too enchanting to allow of long repining; so, leaving Lake Hector for some later day, we pursued the pleasant tenor of our way and were soon opposite the south-west cliffs of Bow Peak. Here the valley swings a few degrees to the west, and as the trail takes the turn, a new vista is disclosed.

The steep and rugged battlements of the Waputik still form the western boundary of the valley, but on the east the long corrugated palisades of Mt. Hector give place to the less lofty summits of the Slate Range, and the valley itself narrows considerably. The upward slopes continue through the open meadows and groves of jack-pine spruce and fir.

The grassy places were starred with hosts of lovely flowers ranging from the gaudy painted cup to the humblest saxifrage, and along the gravelly banks of the river the epilobiums were scattered in vivid patches. One little island in mid-stream was so covered with this rosy tinted flower that hardly an inch of the rocky soil it sprang from could be seen; and I shall not easily forget the glowing splash of color it made, riding like a little raft of gay and sunny blossoms amid the green racing water.

All through that halcyon day we travelled northwards — across streams and meadows, through the chequered shades of pine groves, and past where the wonderfully sculptured Crowfoot Glacier thrusts down its icy talons towards the flashing waters of the Lower Lakes. By late afternoon we found ourselves on the sandy beach, where the trail comes out upon Bow Lake itself — a great basin of green, glacial water, two miles across. On the left, shattered limestone

precipices and talus fans fall steeply to the water, but the eastern shore is low and swings northward in a gradual curve to the north-east corner of the lake. Here a wide treeless moorland bounded by dark woods and converging mountains rises to the summit of Bow Pass three miles beyond.

The sun was now rapidly nearing the cliffy rim of the mountains to the west of the Pass, and such a splendour of golden light flared from the water that it was impossible to discern clearly the farther shore. The trail around the lake is very marshy so for the greater part of the way, the horses splashed along the gravelly shallows. As we rounded the north-east corner the Bow Glacier came into view, streaming down between rocky portals from the upper snows, its splendid ice-fall already in evening shadow.

We headed westward for the woods bordering the stony flats through which the glacial outflow enters the lake, and were soon so close to the huge and sinuous stream of the glacier that we could see the séracs projecting from the icefall. In the direction of Mt. Gordon, whose crest just topped the skyline a new expanse of névé lay revealed. Billowy and sunset flushed, it broke in great waves against the cliffs of Nicholas Rock, which thrust itself like a black tusk through the ice. When close upon our goal we found the way barred by a rock-silde, across which it was impossible to take horses; so, to the derisive squeaking of the picas, we were forced to retrace our steps. We followed our back tracks for about a mile, and made camp in a grove of timber which has been the camping-place, I suppose, of every party that has passed that way. Here we found plenty of old tent-poles and rejoiced, for the gloaming was well upon us and I'm sure the proverbial hunter never felt more famished than we did.

As the next day was to be spent without moving

camp, we planned, before turning in, what should be done on the morrow. Most of us decided to go up to the summit of the Pass. Oliver and Konrad were for climbing the mountain to the west of the lake, but as it looked a very shaly customer no one except the Doctor enthused.

His zeal, however, sprang from a subtler desire than a mere "victory of ascent." He coveted a piquant joy of hearing them rustling their shivering breakfast, while, from the luxurious depths of his sleeping bag, he could exult and jeer and then sink back into a sleep tenfold more blissful than before. So, with his merry eyes sparkling with diabolical enthusiasm, he egged them on and set his alarm-watch for the chilliest hour of dawn.

In the night the weather changed, and morning broke grey and overcast with the distant view blotted out by mist. The Doctor had not failed in rousing Oliver and Konrad; but the rest of us were in no hurry to start for the Pass, now that the outlook was obscured. I had looked forward with keen expectancy to the inspiring view which I knew lay beyond, but—

"It ain't no use to grumble and complain;
It's jest as cheap and easy to rejoice;
When God sorts out the weather and sends rain,
W'y rain's my choice."

So, giving up the Pass, Harmon, Ballentine and I set off to see what we could of the Bow Glacier. We approached by the gorge known as Gordon Canyon through whose narrow and almost subterranean channel the torren from the glacier rushes to the lake. It is bridged by an enormous boulder quite 25 feet across and about the same distance above the stream. We had a capital day and penetrated to the heart of the ice-fall. Harmon was very keen to get some good pictures of séracs, but the lack of sunshine was against him.

As we came down the tongue in the afternoon, a wicked thunderstorm appeared over Nicholas Rock. Lightening flashed from its murky clouds and terrific thunder reverberated among the crags above us we made what speed we could over the terminal moraine and then took a bee-line through the timber for the corner of the lake. As we came out on the stony flats near the rock-slide, we were hailed from the bushes and found Mr. Wheeler, Worsfold, and Miss Longstaff in shelter there, for the storm was now well upon us and rain falling in torrents. On account of the lightening, we were made to deposit our ice-axes at a safe distance before being allowed to join them. They had just paid a visit to the canyon and were going to wait under the trees till the storm passed; but as we were already wet, and driving curtains of rain kept sweeping across the lake in seemingly exhaustless fashion, we decided to keep on.

Just before reaching camp the downpour moderated, we found Oliver and Konrad already in. They had made their peak and got back before the worst of the storm. Logan, looking enviably moisture-proof in his yellow slicker, had the fire still going, so we soon had a tremendous blaze, and dried out in no time. Meanwhile Dr. Longstaff and Miss Vaux, who had gone up to the Pass in spite of the weather, returned absolutely saturated from their passage through the low bushes which cover the moorland leading to the summit. Not long afterwards, our little band being again united by the arrival of Miss Longstaff and her Cavaliers all our fancies fondly turned to thoughts of grub. A regal spread awaited us. Dr. Bell (an embryo *cordon bleu* if ever there was one) had devoted the best part of the afternoon to its concoction. Its mainstay was turkey mulligan of a never-to-be-forgotten savor and flavor. It had dumplings in it!—though after the first few

minutes not even the most active spoon could resurrect the semblance of one; and as for the soup itself, a second helping was a matter of course a third was not out of the way, and if my memory serves, someone, without the faintest suspicion of diffidence or a blush, ladled out a *fourth*. Miss Vaux and Miss Longstaff contributed a bannock of their own mixing which proved so good, that when it came to the Doctor, he refused to let it go farther. In fact, as Dr. Johnston said one day to Allen, the printer—"Sir, we could not have had a better dinner had there been a *Synod of Cooks*." It was followed by the jolliest of camp fires. Everyone remembered a good yarn to tell, and Konrad capped them all with his tale of "Der Million Guide"; so, when the "Herr Director," as the Doctor calls him, warned us that sleep would be required to get us across the range next day, we turned in most reluctantly. However, there was no denying the wisdom of the advice, and before long the camp was in stillness, except for the sound of settling embers in the dying fire and an occasional series of crashes, as a slide of rain loosened rocks hurtled down some couloir in the cliffs across the lake.

Friday came in with a rosy sunrise, and in spite of our hopes for fair weather, the old proverb about red mornings held good, and the fine color soon gave place to grey sky. We set out at 7.30 a.m. leaving the tents and other *impedimenta* in the care of Charlie and Joe, who were to return to Laggan. We carried nothing more than was absolutely necessary, for we were to make a camp in the Yoho by nightfall, where food and tents would be ready for us.

After crossing the boulder bridging the Canyon, we swung to our left up the gorge coming down from the snowfields surrounding Nicholas Rock. By the time we reached the ice a drizzle of rain was falling, and behind us, watery mists were trailing about Portal

Peak and Mt. Thompson. We roped at the edge of the snow-covered glacier, and before we had plodded upward very far, the cloud-rack immersed us. We were on two ropes: Oliver leading one and Konrad the other, while Mr. Wheeler scouted ahead. On our left were the western cliffs of Nicholas Rock and on our right the immense expanse of the Waputik snow-fields, but beyond a radius of 50 yards we could see nothing.

A great wind was blowing across the upper snows. At times it thinned the flying scud of clouds and allowed us momentary glimpses of the dark cliffs on our left; but before long, the mists thickened, and even this aid to navigation was denied us. However Mr. Wheeler still kept going, and wrapped in our white and windy shroud, we followed after. At intervals, we would halt to shout for an echo from the cliffs, and by cautious going, managed to make to the end of Nicholas Rock in safety. From there to our objective point, the Vulture Col, we had an open space of snowfield to cross. Nothing daunted, Mr. Wheeler forged ahead.

The wind was blowing stronger than ever, and it began to snow. In the midst of the wild, swirling weather, we looked a strange, forlorn little crew that we could not forbear from laughing at our plight. The Doctor compared us to band of lunatics, who, for some incomprehensible whim, had climbed up to the snow-fields and were now being led back to the valley by their keeper. In high glee he offered odds that we would be, if we were not already, hopelessly lost. However, we pegged away, and after a time, found the snowfield beginning to rise steeply. Up we went, and before long found ourselves on a ridge of bare and splintered rock. On the farther side it was sheer precipice falling into misty depths, and the wind howled across it in such sustained fury that it seemed as if we would be lifted from our feet at any moment and whisked

over the edge. In this pleasant place a council of war was held, and after a series of short-range shouts, Oliver, who had an idea that we were above our pass on the north-east arête of Mt. Gordon, unroped and clattered out of sight down the ridge. The rest of us sought what shelter we could find from the boreal blast and waited for the upshot.

At last we heard a shout; and breathless from his dash up the ridge, Oliver reappeared with the good news that the pass was not far below. Our faces which had been gradually assuming a melancholy cast, now brightened up very considerably, and before long we were all on the Col. On the ridge rising to the north-east, the rocky vulture, which gives the pass its name, flashed out of the mists to have a look at us, but was buried again in an instant.

What a relief it was to go down the leeward slope out of the hurly burly above! The roar of the wind died with such suddenness that we seemed to have passed into a different world and the air, though watery and full of wreathing mist, was still clear enough to let us have a view of the great ice-field below. From Mt. Olive to Mt. Balfour and across the full width of the range it stretches in an unbroken sheet, save where crossed by a striking medial moraine which follows the current of both the outflows—one descending to Lake Hector and the other to the Yoho.

The slope we now descended was fairly steep and severed by a fine bergschrund; but under Konrad's guidance, we traversed to the left, found a bridge, and got safely across. The camera fiends bewailed the poor light, for it was a most presentable chasm, and would have made a first-rate picture. However, the noon hour was well past, we had nothing to eat but lump-sugar and raisins since morning, and there was need for haste; so, with the promise of lunch on the moraine,

we increased our pace. The firm snow which had prevailed on the north side of the pass was now replaced by a shallow, slushy mixture which made the going very wearisome, but we mushed and floundered along without halts. The glacier was noisy with running water, and thousands of little streams were hurrying downwards with us. Sometimes they ran free in blue channels of clear ice, sometimes lost themselves in great pools of greenish slush, and at others leapt roaring down the shafts of ugly *moulins*. The whole surface of the ice-field was alive.

About 3.30 p.m. we gained the moraine, and inhospitable as were its cold boulders we were glad enough to rest upon them and consume our still colder meal. The wind seemed to come from all directions at once, and rain swept over us in chilly gusts. At times the gale tore the mists apart and allowed us fleeting glimpses of the mountains bordering the Amiskwi Valley; but of Mt Balfour, which rose immediately ahead of us we saw nothing, and the position of the valleys themselves was only indicated by a darker tinge to the vapor, where it hung above their sombre gulfs. Never, I suppose, has a party crossed these snowfields and seen less of them.

It was colder than man's ingratitude on the moraine, so we didn't linger at our feast. Hardly had we swallowed the last mouthful, than we were again under way and making all speed valley wards. We kept close alongside the moraine, and about 5 p.m. came out upon the forefoot of the glacier. On leaving the ice we descended through a series of desolate, moraine strewn flats separated from one another by cliffs, over which the torrent from the glacier came down in splendid cascades. It was a most inhospitable region, pent in by walls of rock and ice, whose tops were buried in mists; and with all moraines, the going

was atrocious; but some distance down the valley a slender column of violet smoke rose from the drenched woods, and the sight of it gave us fresh heart. Still further on, the gaunt cliffs of Mt. Vice President towered imposingly above the dark forest; the only cloud-free mountain we had seen that day.

As dusk was coming on we reached the snout of the Yoho Glacier after scrambling over a remarkable barrier of down timber, which some bygone avalanche had evidently piled up along the edge of a now vanished ice-tongue. The dead logs still lay when the glacier had blocked their downward course, overlapping one another just like the rails in the snake-fences of Ontario farms. To avoid fording the torrent rushing from the arch in the forefoot of the glacier, we climbed across the ice, and in the steep slope of its farther side, found steps already cut for us. A few moments later we were being welcomed by Richardson and Salter, who had come down with tents and food from the camp in the Little Yoho.

The woods were steaming with moisture, but a couple of smouldering fires gave out a gracious warmth. We had to get along without dry garments, for the things we had expected were not yet through from Field. The ladies, however, after a few moments' retirement to their tent, came out marvellously spick and span, and Richardson, who had quite given us up, lost no time in spreading out the contents of his larder. When our Gargantuan hunger had been in certain measure appeased, we built up the fires and dried out enough clothing to sleep in.

So ended our memorable crossing of the range. Being all true "brothers of the sun," none of us would have objected if old Sol had been a little more free with his beams, but in spite of his niggardly behaviour, every step of the way to me was full of novelty and

enjoyment—to say nothing of the excitement that prevailed before, thanks to Mr. Wheeler and Oliver, we hit upon the pass.

In the night the clouds vanished, and we woke to find the valley flooded with radiant sunshine. We spent the morning in moving on to the upper camp, which was pitched at the farther end of the Little Yoho Valley. The trail led us up through fine woods and past the Twin Falls, which were pouring down a tumultuous flood of foaming water. It was a delightful walk. The sky was blue, the woods were sunny, and best of all, our clothes were once more dry.

A more pleasing camp than that in the Little Yoho it would be hard to imagine. It was situated almost at timber line and just below the Little Yoho Falls. Immediately above the tents rose the northern cliffs of Mts. President and Vice-President. They were the most prominent peaks in sight, but Mts. Habel, Carnarvon, Marpole and Collie, all good climbs, were within easy reach. That Alpine Celestial, Jim Quong, was in charge of the cook-tent; and after we had paid homage at his shrine, we whiled away a lazy afternoon basking on the sunny heather.

Round the camp fire that night memories of the six-day expedition of the previous summer were recalled, and we composed a letter to the oversea members of that expedition recounting the various delights and perils we had just passed through. Everyone contributed, and at times words, sentences, criticisms and emendations flew in such clouds that our harassed scribe called out for mercy, as within the flickering illumination of a tallow candle he struggled to record the eloquence. Everybody signed it, including Jim Pong.

The next day, Sunday, our little party broke up. We were awakened by Mr. Wheeler pounding on the

tent with a balsam bough. The Doctor vowed it was enough to make a parson swear and turned over for another wink; but no sooner had he settled himself than his alarm watch broke loose with a buzz; so, seeing it was useless to contend with the gods, we all got up. After breakfast the Doctor and several others went out to Field over the Emerald Pass, and Mr. Wheeler and Ballentine with the ladies rode out by Summit Lake. Their departure brought to a close as happy and care-free a week as can well fall to the lot of mortals, and in the vistas of my memory, I shall always mark it with a whiter stone. The only regret is that the chronicle of its pleasant days was not entrusted to a readier pen.

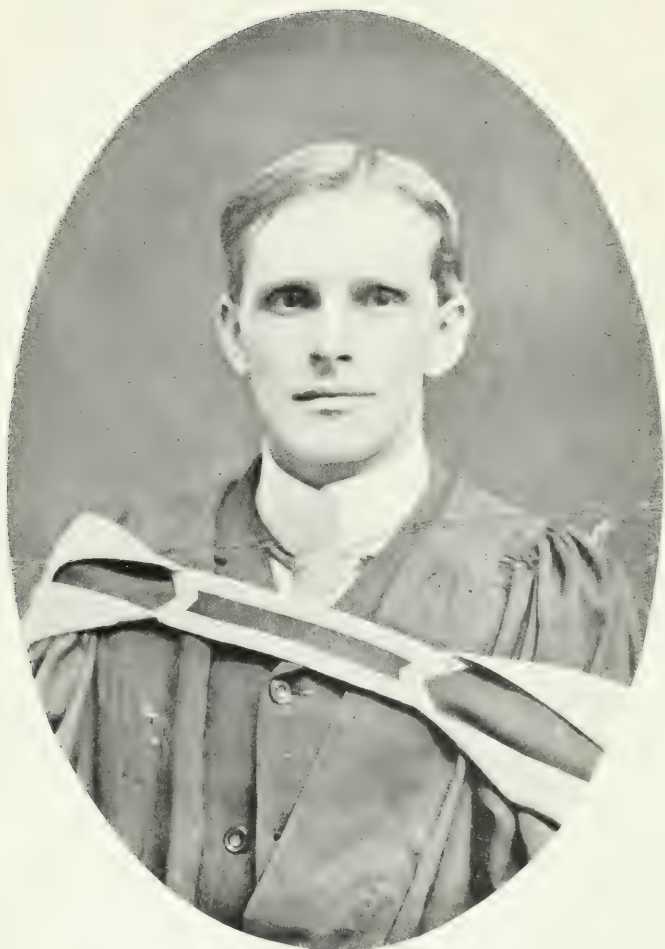
IN MEMORIAM.

ARTHUR L. KENDALL, M.D.

In Vancouver, on October 8, 1910, occurred the death of Dr. A. L. Kendall, a most highly valued member of the Alpine Club of Canada. Dr. Kendall was born at Rockland, Ontario, in 1876. He lived in Texas for a few years, but his heart was always Canadian, and he returned to his mother country in 1889, making his home in Sapperton, B. C., where he lived for some ten years. He attended High School in New Westminster and entered McGill University in 1897, graduating in 1901. In 1902 he married Miss C. Woodley of Moose Jaw, and settled in Cloverdale, B. C. During 1905 and 1906 he studied special branches of his profession in the hospitals of Boston, Chicago and other great cities. Finally he settled in Vancouver, where his fine record in major surgical operations gave ever promise of a most distinguished career.

He had a keen interest in every movement that tended to the benefit of the community. Though he took no practical part in politics he used his influence—no small one—to promote the highest standard of purity in the party to which he belonged. It was the purely national spirit of the Alpine Club of Canada which first attracted him to that body. He graduated to Active membership on Mt. Huber during the period of the O'Hara camp. There the mountains threw their spell upon him and held him to the last. His trying trip to Mt. Baker and the characteristic unselfishness which made him give up his chance of attaining the summit on order that he might not imperil the success of the others are recorded elsewhere.

With his death the Alpine Club mourns the loss of one of its most enthusiastic supporters and feels the deepest sympathy for his surviving relatives.



DR. A. L. KENDALL



Photo M. L. Mumm

MT. ROBSON FROM CAMP



Photo M. L. Mumm

VIEW ON RIGHT BANK OF STONY RIVER



Photo M. L. Mamm

CAMP AT MOUTH OF BRULE LAKE

ALPINE CLUB NOTES.

EXPLORATION IN THE YELLOWHEAD.

This expedition was a sequel to last year's attempt on Mt. Robson which is detailed by Mr. Mumm in the last Journal. In July Prof. Norman Collie and A. L. Mumm again started to visit this most inhospitable mountain. The camp was maintained opposite the Robson Glacier from August 9th till the 26th, while waiting for the snow to clear off even the lower slopes of Mt. Robson, but in vain and no attempt was made upon the mountain. On the 16th a peak behind the camp (about 10,700 ft.) was climbed by A. L. Mumm, J. N. Collie and M. Inderbinnen; the top was reached in a snowstorm. On the 19th the same party together with F. Stephens, J. Yates and G. Swain climbed a snow peak (about 11,100 ft.) at the head of the glaciers which come down into the Grand Forks Valley. An attempt was made on Mt. Resplendent, but the snow rendered it impossible. On September 1st a walk was taken up a side valley of the Smoky River and the interesting discovery was made that the main continental Divide was there, within three hours' walk of the Smoky and well below timber line. This is apparently a new pass. There is no map of this country and little is known of it. The return journey was made by a new route near the Smoky, the Stony, and Hay Rivers and Solomon creek to Brule Lake on the Athabasca. The magnificence of Mt. Robson will always attract climbers, but weather conditions are generally unfavorable, and even under the most advantageous conditions it would never be an easy mountain.

ATTEMPTS ON MT. SIR SANDFORD.

Two different parties made attempts on this mountain during 1910; both were unsuccessful. The party comprising Mr. H. Palmer Mr. Butters and Prof. Holway approached by the Gold River as in previous years. The first attack was repulsed by a belt of ice at an altitude of some 10,100 feet. The clinometer at many places gave readings of from 46 to 48 degrees, and at other points the inclination was estimated as 50 degrees. This trip consumed fourteen hours. After hunting for an easier route the first point of attack was again attempted. Conditions were bad and a boisterous gale at a temperature of 37 degrees compelled another retreat after sixteen hours work. The attempt was then given up, but the capture of a fine rock peak (about 10,700 ft.) to the northwest of Sir Sandford afforded a welcome consolation.

The party led by J. P. Forde included P. D. McTavish, S. H. Baker and the Rev. A. M. Gordon. They entered by the route described by P. A. Carson in the Canadian Alpine Journal for 1909. The railway was left at Six Mile Creek, the first station on the ascent by the railway from the Columbia to Rogers Pass. The second night was passed at Sunbeam Lake and from there the creek was followed

and the point of land bounded by Sunbeam Creek and the Gold River rounded. Camp was pitched at the forks of the Gold River at the foot of the Sandford Range. The bridge of logs had vanished and the stream was deep and the current fierce. The party tried to bridge the stream again but every attempt was swept away. Another attempt was made higher up the stream. A tree at last held fast. In crossing this one member of the party laden with a very heavy pack slipped and to save himself had to let the pack go. Unfortunately that pack contained all the provisions of the expedition, except a very small quantity which would with economy suffice for the return trip. An immediate return was necessary and the mountain was perforce given up. In the present condition of the country the travellers do not recommend this route.

MOUNT BAKER.

On Dominion Day, July 1, 1910, a party of Vancouver members under the leadership of the late Dr. A. L. Kendall and including A. F. Armistead, B. S. Darling, R. L. Gutsell and J. J. Trorey made the earliest summer climb of this peak. Train was left at Bellingham. Camp was made at a height of 4000 ft. on the middle fork of the Nook-sack river. The mountain was made the next day under very trying conditions. Snow was struck at 4600 ft. Later in the day the hot sun made it very soft and the climbers were plowing continuously through two feet deep of snow. Large crevasses crossed the snow-field and a huge bergschrund was encountered. Fortunately careful searching enabled the party to find snow bridges in each case. About 2.15 at an elevation of 9100 ft. Dr. Kendall found the work telling on him severely and with characteristic generosity rather than retard the party he gave up all hope of making the summit and returned to the camp. At the "crater" about 500 ft. below the summit the party were greeted by heavy sulphurous fumes which emerge from several small openings. The summit was reached at 5.30 p.m. and but a short stay was made in the bitter cold. No view was obtained from the top drifting mists hiding everything, but on the descent several enchanting glimpses were caught through the rifts. Darkness was closing in as timber line was reached, and Dr. Kendall was relieved to see them return in safety to the meal he had been busily preparing. Vancouver was reached the next evening.

MT. ASSINIBOINE

FIRST ASCENT OF N.W. FACE.

On July 4th, T. G. Longstaff with Rudolph Aemmer as guide left Outram's camp at 4.15 a.m. Crossed Outram's "first col" at the base of the N. W. arete and traversed neve under N. W. face to "second col" at foot of main W. arete. From the second col they traversed back up the steep snow of the N. W. face, commencing step-cutting at once. Then a succession of steep ice-couloirs constantly forced the climbers towards the middle of the face. Step-cutting was almost continuous with the exception of two vertical bands of rock about 15 ft. high. The foot of the final cliff was reached about 1 p.m. There things looked hopeless. There was no handhold for the first 10 or 12 feet. Finally by using each other's shoulders the climbers managed to reach a hold. The cracks of the rock were full of ice and fingers were deadened to sensation. At about 60 ft. a good anchorage was got over a

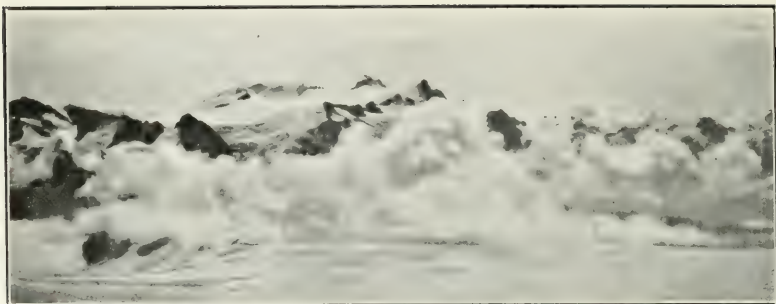


Photo B. S. Darling

MAMQUAM GROUP, EAST OF GARIBALDI



Photo B. S. Darling

NEAR THE SUMMIT OF GARIBALDI



Photo B. S. Darling

MOUNTAINS NORTH OF GARIBALDI

projecting block. From thence step-cutting in steep snow led the party to the summit at 2.15 p.m. It was not possible to return the same route and the descent was made by the N. ridge. Camp was reached at 1.15 a.m.

The long outlying northern spur was traversed by the same party with the addition of Miss Longstaff. None of its peaks appear to have been climbed previously. On July 8 the terminal peak christened Goat's Tower (about 9500 ft.) was ascended by the steep rocks on its S. E. face. On July 9, the spur was followed from its commencement at the first col over several minor summits and the highest peak christened Mt. Katharine (about 10,000 ft.) was traversed from W. to E.

MT. TUPPER A RECORD ASCENT.

An ascent was made of Mt. Tupper last August 13th the times of which may interest many readers. The well known but near tree line was found to be so dirty and full of porcupines that it was preferred to bivouac in the open air in a grassy hollow just below the moraine of the Rogers glacier. At 3.00 a.m. the weather looked unpromising so the bivouac was left at 3.25. The route was taken under the snout of the glacier and up easy scree and snow slopes to the ridge joining Mts. Tupper and Rogers. Following this ridge and keeping to the snow as much as possible about half an hour's scrambling ended at the gap just below the "Hermit," and there the rocks were tackled.

From that gap to the rocky plateau above the "Hermit" is rather a nasty bit, but by traversing to the right on a narrow ledge the chimney which appears to be the main difficulty, was avoided. Another twenty minutes interesting climbing up the ridge, swinging to right or left as occasion demanded and the top was reached. The weather was bad allowing no view, so only 15 minutes was spent on the top. Thence to the bivouac where the kit was packed up and down the trail to the railway. The train just pulled out as Rogers Pass was reached and the walk to Glacier house ended at 9.10 a.m.

TIMES ON CLIMB.

Left bivouac.....	3.25	a.m.
Ridge, joining Tupper and Rogers.....	4.15	"
Past "Hermit" (on plateau just above it).....	5.05	"
Summit.....	5.30	"
Left Summit.....	5.45	"
"Hermit".....	6.05	"
Ridge (same point as in ascent).....	6.45	"
Bivouac.....	7.00	"
Hut.....	7.25	"
Track.....	8.00	"
Glacier House.....	9.10	"

MT. GARIBALDI.

A RECORD CLIMB.

On September 5th a party of the Alpine Club of Canada made the fourth ascent of this mountain. The members comprising it were B. S. Darling, A. F. Armistead, A. N. Cowdry, A. Morkill, and A. P.

Wedgwood. Mr. W. G. Barker also accompanied them. The route was largely the same as in the earlier ascents and was made in three days absence from Vancouver.

GRAND MOUNTAIN.

Professor Holway and H. Palmer made the ascent of this peak while in the Selkirks. The route recorded in "The Selkirk Range" was followed almost to Beaver Outlook, but they kept on in a straight line traversing above the icefall of this branch of the Grand Glaciers. They surmounted the rib of Mt. Wheeler and then headed right for the peak where, after the long walk over snow, good rock climbing proved a welcome variation. There are five small peaks on the main ridge and the third was reached from the north end, which they believe to be the summit, though the south peak is such a close competitor that the difference was within the limits of error of the clinometer. The base at Bishops camp was reached the same night after a trip of eighteen hours. The expedition took four and a half days from Glacier House.

CORRIGENDUM.

In the first article, "An expedition to Mount Robson," in No. 2, Vol. II, of the Canadian Alpine Journal, whenever "The Helmit" is mentioned the snow-capped buttress properly called "The Dome" is intended. "The Helmet" is part of the big ridge running down from the top of Robson to the lower end of the Robson Glacier.

REVIEWS

SWISS MOUNTAIN CLIMBS.

By G. D. Abraham.

It is difficult to figure out the class of climber likely to find this publication of real use. It is suggested in the preface that this guide is conveniently small and concise—it is neither; nor is it anything like as accurate or reliable as, for instance, the well-known and truly small and concise "Climbers' Guide" by Coolidge & Conway. The introduction shows, among other things, that the author does not in the least appreciate the difference between a mountaineer and a mere climber. Far too much stress is laid on the advantages to be derived from climbs in the British hills. Men climbing under such conditions often become good rock climbers, but are, as a rule, quite useless as pathfinders. They may become mountaineers, but if so it will be in spite and not because of their early work.

The tendency in the British hills, as in other "school climbing" districts, is to seek out the more difficult routes. This becomes an unconscious habit and one which is bound to and often does lead to failure, or even disaster, in the Alps.

While it is true that many of the accidents happen on rock mountains, yet the reason is not that suggested by the author. The art of rock-climbing is not so extraordinarily hard to acquire, but inexperienced climbers mostly make for rock mountains, far too many of them fail to find the easiest way up or down, and come to grief. In tackling a big mountain decide on a face or arete and find the easiest way up the one or the other or you will never reach the top.

It is only fancy routes which call for great rock-climbing skill, but most of the big mountains require a pathfinder's instinct and thorough snow and ice craft if they are to be negotiated in absolute safety. A mountaineer must be a good judge of climatic conditions, must be a pathfinder, must be skilled on snow or ice, but need not be a star performer on rock.

As to crampons, they should certainly be avoided on rocks, but they can be freely and safely used on steep snow or ice in order to reduce the labor of step cutting.

The illustrations in the volume are good, but some of them give a very misleading idea of the climbs they are supposed to depict. There is, for instance, no such place on the ordinary route up the Eiger as that shown in the frontispiece. The same remark applies to the photograph entitled "Climbing the Wetterhorn." The outline drawings remind one of the popular "Schneehuhn" guide-booklets of Switzerland, and form one of the best features of the book. The various districts are very unequally treated, and the author's predilection for rock mountains is clearly in evidence. The magnificent Bernina district comes in for scant notice, while the Forno, Albigna, and Bondasca groups are among those which are not dealt with at all. These districts do not only offer plenty of splendid climbs, but also a

number of grand expeditions. The best sections of the book are those dealing with the Bel Alp and the Arolla districts.

The book contains a number of incorrect statements, some of which are noted hereafter. In going from the Finsteraarjoch to the Pavilion Dollfuss (Page 49) it is necessary to round the Escherhorn and not the Abschwung. It is not always important to cross the Lauteraarsattel at the lowest depression (Page 50). The best way often lies far to the North, over a rib of the Berglistock. This passage is so useful that it is marked by a Steinmann.

As regards the first party which attempted the east face of the Finsteraarhorn, it was defeated about 1350 feet (and not 350 ft.) from the summit (Page 54). Mr. Hasler and Amatter made the ascent with the help of the ropes left in the most difficult places by the pioneers and took said ropes away with them. Since then, the climb has, nevertheless, been accomplished by a guideless party. The Oberstuderjoch has *never* been crossed and is not likely ever to be crossed (Page 55). The Eismeer Station does not facilitate the ascent of the Mittellegi arete. A good sleeping place has always been available for this expedition, but an extremely steep and difficult passage on the ridge itself has stood and still stands in the way. The Mittellegi has been descended several times, but *never* ascended (Page 74). The descent of the Jungfrau arete has only been achieved *once* (Page 76). It would be interesting to know how any water from the Monch and Eiger gets into the Trummelbach (Page 85). The best route up the Aletschhorn from the Concordia lies up the third rocky rib as counted from the Dreieckhorn. The direct ascent of the ice slope leading to the Aletschjoch is mostly a serious undertaking (Page 116). There are several climbs in the Oberland which are more difficult and far grander than the S. E. arete of the Nesthorn (Page 126). There is nothing unsatisfactory about the South face of the Bietschhorn if properly tackled (Page 150). The big tower on the Wildelsigen ridge of the Balmhorn is out-flanked on the left and not on the right (Page 173). The best way up the Matterhorn from the Swiss side lies close to the arete almost from the very beginning; the long traverses into the face spoken of on Page 185 should be avoided. While the Zmutt ridge is a fine expedition, it is absurd to describe the undertaking as a "Verdammte Dummheit" (Page 192). The final tower of the Salbitschyn (Page 403) has been climbed and without artificial aids.

The description of most of the routes is so sketchy as to afford the guideless climber plenty of opportunity to use his judgment or to rely on the unmistakably plain and very numerous signs which nowadays point the route up any of the better known peaks. Guideless climbing is not what it used to be! At present it is often a case of "Follow the sardine box trail."

The binding appears quite unsuitable for a book presumably intended to be frequently carried in pocket or rucksack.

Val. A. Fynn.

OFFICIAL SECTION

REPORT OF THE DIRECTOR.

Mr. President and Executive of the Alpine Club of Canada—

I have very great pleasure in congratulating the Club upon the occasion of its sixth Annual Camp held in so beautiful a spot. It needs no comment upon the vastness and beauty of our magnificent mountain ranges when we consider that six camps have now been held by the Alpine Club at six different beauty spots, and that there are still other places available without a repetition; and this represents but a very minute portion of the immense whole. It is with the deepest regret that I am absent from the present camp, and only by the fact that it is in the best interests of the future of the Club am I reconciled to such absence. I have done all in my power to make the present camp a success. It is run by a committee of competent men and women under the leadership of our well known and much loved Vice-President, Mr. J. D. Patterson. That fact alone insures its success. I may say that I am deeply interested in this camp. It is the first that has been managed by a committee, and in my mind, that is the proper way it should run. Any organization that is dependent upon one man is weak and the sooner we cut that method out the better for ourselves.

I have no hesitation in saying that the Club is now more firmly rooted than ever before. Its days of childhood are over; it is a youth, sturdy and strong, feeling its own importance, recognized by its elders, and with a definite goal before it, upon which all its energies are concentrated. The goal is the making of an intelligent society to deal with, and take part in all alpine matters connected with the Canadian Rockies, among which the noble sport of mountaineering will always be a most prominent branch. If we work together we cannot fail, for we have behind us a great and inexhaustable range of snow-clad peaks that will furnish full employment for our utmost endeavors and those of our descendants for hundreds of years to come. Last spring, a year ago, we met a cataclysm that seemed, at the time, to leave us little this side of the grave. To-day we are able to laugh at so trifling a disturbance and to proceed on our way, impelled by the great force behind us, which, like the rivers of ice that flow from its midst, is slow and silent, but irresistible.

MEMBERSHIP.

The membership of the Club is, at the time of writing, 597. Our rules demand that any member two years in arrear, to whom the required notices have been sent, shall be struck off the roll. We have prepared a new list of members for circulation, and in the number of members quoted, all delinquents have been eliminated. This is necessary; if we are to succeed we must do business in a business way.

CLUB HOUSE AT BANFF.

I now beg to submit a short statement of our activities for the past year and of the proposed activities for the year that is with us. The season of 1910 began with the opening of the Club House and Camp at Banff on the 15th of June. They were in charge of our Secretary-Treasurer, Mr. S. H. Mitchell and a competent staff. I was there, off and on, throughout the season and kept a general supervision over its management. A new feature was the provision of bedding for those visitors who desired to go into residence. We provided accommodation for ten beds. The year previous all visitors in residence had to bring their own bedding. Such accommodation will, this year, be increased to sixteen. Our guide, Konrad Kain, was at the Club House from early in May until July, when he was taken away for camp work. He was employed building additional tent houses, cutting wood, putting drains and at a hundred and one things that were necessary. Among the principal improvements were the addition of eave-troughs and proper run-off. We shall no longer be bothered from this source in rainy weather. Four new tent houses were built to properly accommodate the staff and provide for overflow of residents; of these, one was a guide house. The Club House was open for visitors until the end of September, and the Director, Secretary and Guide were there until the end of October, closing up the summer business and preparing for a move to our winter headquarters at Sidney, Vancouver Island. In 1909, the year the Club House opened, ninety persons registered. Last year also exactly ninety persons registered. Though there was no increase in the number, the second year was more satisfactory, as the distribution was wider and the number of invited guests smaller, showing a larger attendance. It is hoped that this, the third year, will prove more satisfactory still, and I am happy to announce that Mrs. Wheeler is there to superintend arrangements. I have pleasure in stating that the remaining indebtedness on the Club House was subscribed at the Annual Camp by voluntary contributions. In addition \$50 worth of debentures have been returned for cancellation, thus reducing outstanding liability by \$545.

Again this year considerable improvement has been made at the Club House. The paths to give access to various points have been extended and made on better grades, a store house built and the cellar floor laid in concrete and made water-tight. Owing to the earth push from the mountain behind, one of the cellar walls gave way early in the Spring, and a portion of the building would have been in great danger but for the prompt action of Konrad Kain who was at the house. This break necessitated putting in a concrete retaining wall, so I decided to have the cellar floor done at the same time, as it was badly needed.

Through the kindness of Miss Vaux, Mrs. Parker and Mrs. A. O. Wheeler, from whom money contributions have been received for Club House furnishings, we have been able to provide a handsome photograph cabinet for the library, cocoanut matting for the main hall and oilcloth for the kitchen floor. Dr. Lonstaff has presented a magnificent large sized photograph of Mt. Assiniboine and a smaller one of the Summit of Mt. Trisul, in which he appears. The Club House yearly grows handsomer and more attractive, but has far too few visitors. It does not pay expenses, and yet it is absolutely

necessary to keep it open during the summer, As it is our most apparent means of visibility and is a big advertisement for us.

FINANCES.

Last summer was a pretty strenuous season for so young a Club. Of necessity it entailed a very heavy expenditure. In addition to the revenue of the Club we received a grant from the British Columbia Government of \$1000 and from the Alberta Government of \$500. The Dominion Government refused to assist us, although strongly petitioned to do so, and waited upon by a representative deputation. This is somewhat remarkable in view of the national work the Club is doing and the large amount of advertising accruing to Canada throughout the world by reason of the Club's activities. Neither the Club House nor the Annual Camp paid expenses. It is hardly to be expected that the Club House will do so for a year or two yet, but it is the first annual camp that has not showed a credit balance. Notwithstanding, I am able to report our finances in a healthy condition; all of our current liabilities have been paid, and we have a balance to work with. I anticipate a balance to our credit at the end of the current year.

DECEASED MEMBER.

The Club mourns the loss of Dr. Arthur Kendall of Vancouver who succumbed last October to a severe attack of typhoid. He was an ardent and sincere lover of our mountains and an enthusiastic worker for the Club. We shall miss him much.

OTHER MATTERS OF INTEREST.

It will, I am sure, give you sincere pleasure to learn that Mr. J. D. Patterson, who has worked so devotedly in the Club's interest since its inception, has been unanimously elected an Active Member of The Alpine Club (England). This action is a graceful recognition of Mr. Patterson's good work in the Canadian Rockies and his very keen interest in all Alpine matters. He was proposed by A. L. Mumm and seconded by T. G. Longstaff. A second member of our Club also has recently been elected to membership in the A. C. viz. W. S. Jackson of Toronto.

In closing my statement for 1910, I wish to express my very keen appreciation of the excellent support given me by my staff, from our very popular and hard working Secretary Treasurer, down. Without such whole hearted and unstinted service we could not have reached so successful a conclusion.

The work of the Club for this year has been placed before you in circulars already issued, resulting in the present gathering. A new departure, however, has been made which is one of the utmost importance, as it means a realization of the original ideals of the Club and a practical consummation of its principles, as laid down in the very first clause of our Constitution, viz., "The objects of the Club are: (a) The promotion of scientific study and exploration of Canadian alpine and glacial regions." An arrangement has been concluded by which the Club has sent an expedition to the Yellowhead Pass region during the coming summer to explore and make a topographical survey of the alpine district of the Jasper Park, Yellowhead Pass and

Mt. Robson, with a view to holding our annual camp there in 1912. The expedition is under my personal direction. Its results will be far reaching and will be sent abroad throughout the world through the medium of the Alpine Club. Such an expedition will, of course, cost a lot of money, but the Grand Trunk Pacific Railway and the British Columbia, Alberta and Dominion Governments are collaborating financially and technically with the Alpine Club and no call will be made upon our resources that will in the slightest degree embarrass them. For the past few years this alpine region has been gradually coming into prominence, largely through the exertions of our Club members. Those of our President, Dr. Coleman, his brother L. Q. Coleman, A. L. Mumm, Dr. Norman Collie, L. S. Amery, Mrs. Chas. Schaffer, and last but by no means least, the Rev. Geo. B. Kinney and his companion in success, Donald Phillips. It is my intention to make this expedition of the fullest possible value scientifically and artistically as well as from a mountaineer's point of view. To this end I have succeeded in having proper persons attached to the expedition to deal with the geology, botany, zoology and photography in addition to the topography.

Dr. Chas. Walcott, Secretary of the Smithsonian Institution of Washington, a gentleman who has for years visited the Canadian Rockies for scientific purposes and who is classed among the leading geologists of the world, has come to my assistance. Dr. Walcott's paper, entitled "The Rocks and Fossils of Mt. Stephen," in vol. 1, No. 2 of the Canadian Alpine Journal has doubtless been read with deep interest by all our members. It may be asked why this branch of the expedition is not in the hands of Canadians? In self defence I may say that first of all I applied to the Director of the Geological Survey at Ottawa, through Professor John Macoun, Dominion Naturalist, without success. I next applied to Professor Coleman of Toronto University, and finally to Mr. E. M. Burwash of Columbian College, New Westminster, who is a geologist of repute and a Club member. Failing there I applied to Dr. Walcott, who is a personal friend of my own. He took the matter up with enthusiasm, arranging to come himself for the Geology and to send Mr. N. Hollister of the United States National Museum and Dr. Walcott's son for the other branches of natural history. They were desirous of obtaining specimens of the fauna for that museum, and in return agreed to furnish me with full information for my reports.

Since then this branch of the expedition has expanded, for, while calling upon the Hon. Dr. Young, Provincial Secretary of British Columbia, to secure permits to shoot game while out of season for the purposes mentioned above, he asked if I would undertake to secure at the same time, specimens for the new museum which is shortly to be built at Victoria, and offered to pay all expenses in connection therewith. This I did, and have added an additional naturalist and hunter to the party for such purpose.

It is further part of my agreement with the Hon. W. W. Ross, Minister of Lands for British Columbia, that I should define and mark the boundary between the provinces of British Columbia and Alberta at the summit of the Yellowhead Pass. For this work and full report and maps of our results, the British Columbia Government has given us \$1000 from its survey appropriation, to help finance the expedition. A grant of \$500 for similar purposes has been received from the Alberta Government. The Grand Trunk Pacific Railway has given us very

great assistance. Not only has it contributed the sum of \$2500 towards expenses, but I am armed with a letter from President Hays that will make matters very easy while in the sphere of influence of that Railway. A further sum of \$500 has been contributed by the B. C. Government to the expedition, and in addition, both that Government and the Government of Alberta have given \$500 to the general expenses of the Club. The Dominion Government has given technical assistance of much value by loaning instruments, supplying photoplates and later on doing the photographic work that is necessary for the map returns. The foregoing shows that the good work of the Club is appreciated as an advertising medium of our magnificent mountain assets.

Mr. Byron Harmon, the Club's official photographer accompanies the expedition, and your executive committee has authorized my utilizing the services of our guide, Konrad Kain. The transport and outfitting is in the hands of Donald Phillips who was Mr. Kinney's companion on his daring climb of Mt. Robson. Last, but not least, my chief topographical assistant will be Mr. Geo. B. Kinney, to whom the region has become familiar through his numerous attempts on Mt. Robson before his efforts were crowned with success. You will thus see that it is an Alpine Club expedition composed for the most part of Club members. If I am successful in securing facilities for a 1912 camp I expect we shall find all-rail communication ready for us and some of our old friends among the pioneer outfitters to see that we do not fall down, viz., Otto Bros., Fred Stephens and Donald Phillips.

To the Canadian Pacific Railway, through the courtesy of Mr. C. C. Ussher, Passenger Traffic Manager, and of Mr. Hayter Reed, Manager-in-Chief of Hotels, we are again indebted for special rates to attend this camp, and for the loan of two Swiss guides. I need not say that these courtesies are very greatly appreciated.

I wish here to call attention to the honour that has been conferred upon two of our members on the occasion of their Majesties' Coronation last June. I refer to the degree of Knighthood conferred upon Sir William Whyte, Vice-President of the Canadian Pacific Railway Company, and of C.M.G. upon Dr. R. A. Falconer, President of Toronto University. I am sure we shall all have the greatest pleasure in passing a unanimous vote of congratulation.

You will remember that some two years ago the Dominion Government agreed to allow us to select two acres on the shore of Lake O'Hara as a site for a small Club chalet to accommodate our people visiting that locality. On the 15th of June last, accompanied by the Superintendent of the Yoho Park, I went out to Lake O'Hara. Jointly, we selected a site of two acres at the upper end of the Lake, immediately below Mt. Yukness. The site is in every way suitable for us, and I have great hopes that we will be granted a lease for it. If such be the case, I propose recommending to our Executive Committee that efforts be made to build a commodious log hut there, comprising a living room, a ladies' room and a kitchen, with several tent-houses such as we have at Banff for sleeping purposes. By placing a care-taker in charge for the summer months, our members will be enabled to visit the beautiful valley and spend some time there in the manner that we all love so well. This beginning of Club huts is a most important step in the direction of making travel in the Canadian Rockies similar to that in Switzerland, where you can leave your hotel in the morning, go out to visit some beautiful alpine place and find a shelter ready for you for

the night, and so be enabled to spend a day or two in the midst of such surroundings without the deterrent of a prohibitive cost. This is what our Club members want, and not only our Club members but the general nature-loving public, and until such facilities are available, the Canadian Rockies will not become a Switzerland, or anything like one.

I very strongly advocate the building of small chalets by the government at suitable beauty spots—a dozen or more may readily be named: Lake O'Hara, Mt. Assiniboine, Upper Yoho Valley, Moraine Lake, Yoho Glacier, Ptarmigan Valley, Upper Bow Lake, Hector Lake, Sherbrooke Lake, Ice River Valley, Paradise Valley, etc.—and leasing them to competent persons for a low rental, at the same time retaining the right to fix the rates. If the C. P. R. Chalet at Emerald Lake can be filled with guests during a season there is no reason why smaller buildings of the same nature at other equally or more beautiful spots should not be made to pay. Such an arrangement would bring in a totally different class of people—the class that has made Switzerland what it is to-day:—those who want to travel in the midst of Nature and study the great wonders of the Almighty without having to suffer a repletion of the effeteness of modern civilization from which they are striving to have a short reprieve.

There is still another view to be taken, viz., that such an expansion of facilities for enjoyment of our alpine tracts by our people and the outside world, would open up a very paying industry for Canadians through catering for such centres, supplying transport to them and guides at them; always—mark you, always—provided that such an industry was not allowed to fall into the hands of a transport monopoly such as exists to-day along the line of the Canadian Pacific Railway through the Rockies, and which has driven most of the old and thoroughly competent outfitters and guides from the district to fill their places with incompetent youths who, decked in buckskins, swagger up and down the station platforms and try to look knowing—Guides! God save the mark? I have no hesitation in saying that the present transport monopoly in the Main Range of the Canadian Rockies is altogether detrimental to its advancement as a revenue producing agency for the country at large—for why? the monopoly takes the money out of the country to pay big dividends to the American shareholders that are behind it. So long as this condition of affairs exists, there need be no talk of a Canadian Switzerland, for such will not materialize. The only power that can effect a change is the Dominion Government, and it is high time the Dominion Government took a hand in, and no uncertain hand at that. That Government holds this huge world's recreation ground in keeping on behalf of the people of Canada, and it is its duty to see that it is governed in a manner that is in the best interests of the majority of the people.

The fifth issue of the *Canadian Alpine Journal* is now in hand. It will be an interesting number, but necessarily, not so full as last year.

A number of Amendments to the Constitution have recently been passed. They are the outcome of much discussion and careful thought by numerous members, and are designed to meet requirements that have become necessary. Not a little opposition was displayed towards the admission of science members. This I believe is due to a misunderstanding of the primary objects of the Alpine Club of Canada. We are generally spoken of as a mountain climbing organ-

ization and people, while they admire our athletic achievements, talk to us with a half-pitying, amused complacency that is born of actual ignorance. We are not a climbing club. The primary object of the Alpine Club of Canada is the development of Canadian mountain regions on all lines scientific, literary, artistic and athletic; in fact in all that appeals to the intellect rather than to the pocket, though one follows the other. Mountaineering is but one of our many branches. If, therefore, we are to become a staple and long-lived institution, we must be ready to embrace something more enduring than mere athletics. The work we have undertaken in the Yellowhead is a fair sample of what we aspire to as a life work. It is one that cannot but give us a creditable stand, and, even if it is not successful, the effort will at least command respect as something tried that was worth the while.

With regard to the badge of the Club, it is given for achievement and can always be won by those who achieve. The badges will be numbered consecutively from 1 on. Already a considerable number have been applied for. It gives me great pleasure to state that the first application for a badge came from the Rev. Geo. Kinney of Mt Robson fame; the second from Mrs. A. F. Wedgwood (formerly Miss Katharine Longstaff) and the third from Dr. Tom Longstaff. Now is the time to achieve and secure your badge—the qualification required for it will never be easier.

I must apologise for the length this report has reached. It is a statement of facts and will serve to show that the Club was never more alive and in earnest than at the present moment.

With my most fervent wishes for the complete success of the present camp and the assurance that only my duty to the Alpine Club could prevent my being present.

I have the honour to be,
Mr. President and Executive of the Alpine Club,
Your obedient servant,

ARTHUR O. WHEELER,
Director.

To the President and
Executive of the Alpine Club of Canada.

LIBRARY REPORT.

As will be seen from the appended list, the Club Library, continues to grow. We have, however, a large room, and there is space for many greatly desired volumes. One thing continually demanded is a good modern atlas, with clear maps especially of European countries.

In addition to the Exchanges we have been making for the past few years we now receive the annuals of the German-Austrian and of the Swiss Alpine Clubs; the latter to date from the present season. We also exchange with the Royal Colonial Institute which sends us "United Empire" each month.

Among the gifts of this year will be noticed one from Mr. MacCarthy whom all who were on the Six-day trip after the O'Hara camp will well remember. Miss Finlayson, after much trouble, has been able to find a portion of Palliser's Report, perhaps the most sought after of Canadian geographical works. Mr. Mumm has given us the first sixteen volumes of *The Alpine Journal*, which, with the numbers we already possess, completes our set. This is a foundation stone of any good, mountaineering library. Mr. Eaton who was with us at Banff last year has presented *The Matterhorn* by Guido Rey which he has himself so brilliantly translated from the Italian. Another mountain monograph is "*The Mountain That Was God*," (Mt. Tacoma,) a beautifully illustrated work which Mr. Freeborn sent us, as also a book of his charming photographs of the two camps of 1910. Mr. Yeigh has presented us with his new work. *Through the Heart of Canada*.

Of pamphlets the titles subjoined speak for themselves. Dr. Longstaff cautions us that the whole subject of Mountain Sickness is much disputed and that the end is not yet. Dr. Tempest Anderson's paper on Matavanu is a careful detailed study of the action of a lava stream illustrated by most instructive photos. Professor Hobbs of Michigan University puts forward theories concerning the sculpture of mountain forms from the original upland, which though not universally accepted, command respectful attention.

The following is the list of additions to the library since the 1910 report:

Author	Presented by
Recollections of an Old Mountaineer, W. Larden, E. F. M. MacCarthy	
Palliser's Report (Portions).....	Miss A. Finlayson
The Matterhorn Guido Rey.....	J. E. C. Eaton
The Alpine Journal Vols 1-16.....	A. L. Mumm
The Mountain that Was God, J. H. Williams....	F. W. Freeborn
Album of Photos of 1910 Camps, F. W. Freeborn, F. W. Freeborn	
Through the Heart of Canada, F. Yeigh.....	F. Yeigh
Swiss Mountain Climbs.....	G. D. Abraham ... Review Copy

Pamphlets presented by the authors:

Mountain Sickness.....	T. G. Longstaff
Tramps across Glaciers of B. C. and Three New Ascents in the Selkirks.	Howard Palmer
Volcano of Matakavanu, Sawii.....	Tempest Anderson
Origin of Oceanic Basins in Light of New Seismology, W. H. Hobbs	
Evolution and Outlook of Seismic Geology	W. H. Hobbs
Cycle of Mountain Glaciation.....	W. H. Hobbs
Earthquake of 1872 in Owens Valley, California ..	W. H. Hobbs
The Messina Earthquake.....	W. H. Hobbs
Apparatus for instruction in Geography and Structural Geology, W. Hobbs.	

REPORT OF 1910 CAMP.

SITE OF THE CAMP.

The fifth Annual Camp was pitched in a delightful grove of spruce trees on the east side of Consolation Brook, the stream flowing from the lower of the two Consolation Lakes. It is a picturesque spot full of charming little glades, shadowed by long sweeping boughs. Consolation Valley is a splendid example of a hanging Valley, and is tributary to the well known valley of the Ten Peaks. As a giant corner stone marking their divergence stands the Truncated Tower of Babel, a huge, circular rock mass, quite in keeping with its name.

At the scarp of the Valley Consolation Brook plunges wildly down the steep incline with a thunderous roar; above, the valley floor is fairly level and soon opens to a grassy meadow through which the stream winds in a broad and placid flow. Directly opposite the camp great boulders and tiny islets grouped close together is the stream, enabled access to be given to the camp by a number of impromptu bridges made of poles. Directly beyond lay the two lakes separated only by a short and narrow passage. The lakes are of small size and of a bright, jewel-like blue, the upper one bordered on the south by the ice of a glacier from whence the supply of water comes. Nearly the whole of the western side of the valley is enclosed by the precipitous walls of Mt. Babel, broken by many minarets and towers rising in fantastic piles of mountain architecture from its very base. At the end of the valley, against the sky line are seen the four squat towers of Mt. Quadra separated by a deep notch from the two spires of Mt. Bident. Between Quadra and Babel the line of the elevated neve of the Heejee Glacier is seen high in air, its depth shown by the great ice wall along its margin, where the slowly advancing ice breaks over the edge of the precipice and falls in a constant roar of avalanches to the depths of Consolation Valley. During the period of the camp these avalanches were incessant and furnished a source of continual excitement to the campers, besides some very spectacular sights.

Between Mt. Bident and the peaks along the east lies Consolation Pass (8300 ft.) providing a means of access to the Boom Lake Valley and the glacier and snowfield at its head. The Pass is an easy one, approached by traverse of rather steep slopes of snow. Still further east, separated by a spur of the north Boom Lake ridge, is another pass, a low one, leading to a pretty little deep blue tarn, known as Taylor Lake, which empties into the Bow River, below Laggan. From here on the hills along the eastern side of Consolation Valley are low and uninteresting until you reach the summit, when the whole panorama of the Bow Valley is unfolded and an endless array of peaks on its northern side, from out of which the South Tower of Mt. Douglas rises most conspicuously. The Bow Valley is nearly 2000 feet lower than Consolation Valley, and its southern walls show black ragged precipices, sharp aretes and mighty buttresses falling to easy rolling slopes, covered by green or burned timber.

The Camp was very compact and snugly located. The arrangement was somewhat different to previous years, all the official section being placed in the form of a square around and under the edge of the huge canopy that covered the dining tables. On one side were the cook's quarters, directly opposite, the office tents; on the side between the two the ladies' tea tent and the path giving access to the store tent, the guides' quarters and the main approach to Camp. The fourth side was walled in by trees with an exit from their midst leading to the Ladies' Quarters, which were charmingly situated in a little open space between two lines of spruce trees; many of the smaller tents being pitched directly amidst the trees. To the south of the Camp, on the opposite side, in a similar opening, but on a steeper incline lay the Men's Quarters. In conjunction with the regular mess of the Camp a subsidiary mess tent was erected near the store tent. This was an old feature with a new purpose. Heretofore such a mess had been confined to the use of the packers, guides and other employees of the Camp; now it was also used to supply meals out of the regular hours. It worked admirably and supplied comfortable hot meals to all belated parties or persons arriving when the set meals were over. The commissariat was again in charge of Dr. Fred. Bell and under his extremely efficient management carried out its duties without a hitch. The Camp Chef was our old friend Jim Pong, who has so ably administered four of the five camps already held. Jim and his assistants were the perfection of camp machinery, and the surest token was the fact that there were always plenty of good things to eat just when they were wanted.

The Camp was reached from Laggan Station on the Canadian Pacific Railway. Visitors could either be driven direct to the Camp or to Lake Louise Chalet and from there to the Camp. The driving was done by the Brewster Transfer Company to the end of the Government road leading to within a mile and a half of Moraine Lake. The service was a poor one and caused considerable dissatisfaction; unfortunately it was outside the control of the Camp authorities. A contract had been made with the Transfer Company, but the service was bungled by incompetent subordinates, causing much annoyance to many of our visitors. Opposite the end of the road, by the side of Moraine Creek an outfitters' camp was established and from this point a trail was cut out to connect with the pony trail leading to the main Camp. The pony service was superintended by Closson Otto and had among those handling it the well-known outfitters and packers, Jimmy Simpson, Ernest Bearley, Bert Barrow and Charlie Logan, all good men, and the service went smoothly.

The following mountaineering Clubs were represented; The Alpine Club (England), the American Alpine Club, the German-Austrian Alpine Club, the Italian Alpine Club, the Swiss Alpine Club, The Appalachian Mountain Club, the Fell and Rock Climbing Club.

Members of the following learned societies were present: The Royal Society, The Royal Geographical Society, the Royal Meteorological Society, the Royal Society of Medicine, the Zoological Society.

GUESTS.

This year there was no British Association meeting and hence there were not so many British guests. Those of whom the Club saw most were Dr. and Miss Longstaff. The Dr. well knowing the Alps,

the Caucasus and the Himalya was fascinated by the Canadian mountain region and will doubtless return many times. Mr. George Vaux, Sr. of Philadelphia, who has visited the Rockies and the Selkirks, year by year since the railway was opened was a most welcome guest.

THE CAMP FIRE.

The camp fire, was as usual the evening centre of attraction. There is something peculiarly fascinating in watching the flames lick up towards the black, star-strewn sky, surrounded by the tall spruce trees overtopped by mighty precipices of rock crowned with stained snow. The sing-songs varied in excellence. L. S. Amery's camp fire song, inspired by last year's experiences at Lake O'Hara was rendered several times. Miss Chevrier's recitations were greatly appreciated. The audience was most enthralled, however, when Dr. Longstaff could be induced to relate some of his Indian experiences. It is perhaps making much of little, but it is such intercourse as this that makes fellow subjects from different parts of the Empire understand each other and tends to bring about a most beneficial solidarity. One night blankets and quilts were purloined from the tents, the ladies dressed their hair in braids and an Indian pow-wow was held, the big dish-pan forming an effective tom-tom. This all sounds very childish, but to enjoy camp life thoroughly one must revert to the child-like spirit. The fact remains that to the healthy mind it is singularly attractive, and to the wearied brainworker, singularly restful.

THE ANNUAL MEETING.

In accordance with the Constitution the Annual Meeting was held in Camp on the one stormy morning to which the Clerk of the Weather treated the Club. The retiring President addressed the Club giving a synopsis of the events of the year and the prospects for the future. He called attention to the great growth of interest in the mountain regions of Canada due to the work of the Club and the valuable publicity it was giving to the treasures at our doors. Many regrets are received from other countries that so few maps are available but as far as was in its power the Club would do its share to obviate this admitted disadvantage.

The reports of the different officers were read and passed. Finances were found to be in good condition and the policy of the Club was declared sound. The Scrutineers reported the members elected to office for the next two years as follows:

Hon. President, Sir Sandford Fleming, K.C.M.G., Ottawa.

President, Prof. A. P. Coleman, F.R.S., Toronto.

Vice Presidents, J. D. Patterson, Woodstock; M. P. Bridgland, Calgary.

Hon. Secretary, Mrs. J. W. Henshaw, Vancouver.

Hon. Treasurer, C. W. Rowley, Calgary.

Director, A. O. Wheeler, A.C., F.R.G.S., Sidney.

Secretary-Treasurer, S. H. Mitchell, Sidney.

Advisers, F. Yeigh, Toronto; S. L. Jones, Calgary, Rev. G. B. Kinney, Keremeos.

The new feature in this election was the office of Director. The object of such a permanent appointment is to do away with the reliability upon one man, and by providing the machinery and salary to

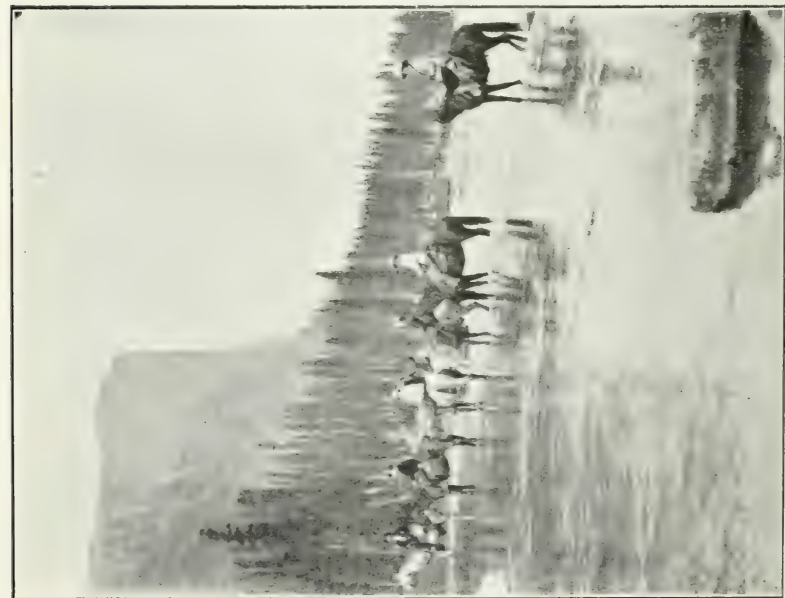


Photo J. F. Boyce

A LAST FAREWELL

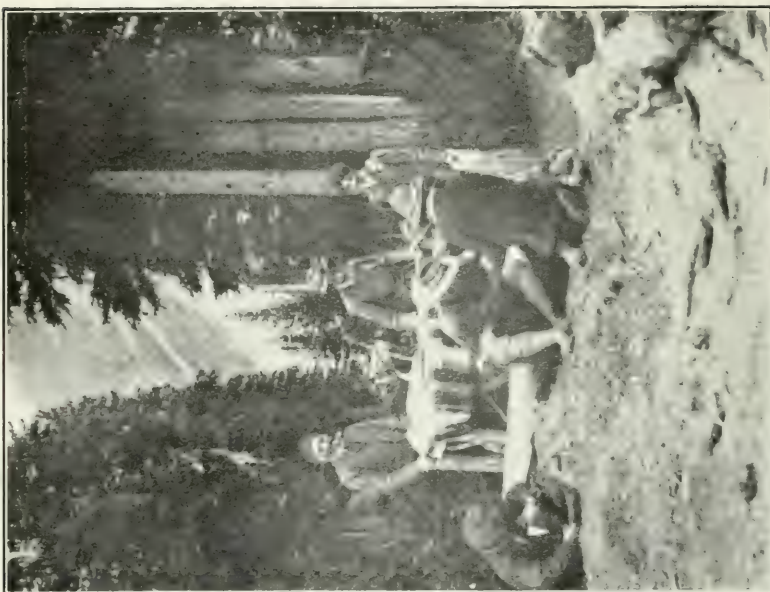


Photo Benj. F. Souer

PREPARING FOR BUSINESS

obtain a suitable person to obviate the possibility of the Club collapsing through the removal by any cause of such a guiding hand. It is only by such an appointment that a continuity of policy can be maintained.

Votes of thanks were passed to the Governments of British Columbia and of Alberta for their generous financial aid; to the Canadian Pacific Railway for their loan of their Swiss guides, Godfrey and Ernest Feuz and Rudolph Aemmer, for a special "Convention" rate to members attending the camp and for many minor courtesies and assistance in the matter of baggage transport, lastly but by no means least to the retiring officers who had so generously given of their valuable time, often at great sacrifice to themselves.

The period of the Camp which lasted from July 19th to 30th was singularly fortunate as regards weather. As already mentioned the morning of the Annual meeting was stormy, but the afternoon was fine. The views from the higher peaks were sometimes marred by the smoke of distant forest fires, but perhaps they were also enhanced by the air of mystery engendered.

A number of volunteer members assisted in making the Camp. They were superintended by E. O. Wheeler, working under my general direction. The thanks of the members attending are due to these willing workers for the very comfortable camp they found prepared for their reception.

Much credit is due to the ladies of the Camp Committee for the very able manner in which their voluntary duties were performed. Mrs. P. Burns kindly assumed the post of Chief of the Ladies Executive, which Mrs. Wheeler, through ill health was unable to fill; Mrs. Henshaw and Miss Durham executed to perfection the duties of assistant hostesses, and, in addition, took charge of the Press work, keeping the newspapers throughout the Dominion well supplied with daily news of the Camp doings.

REPORT ON MOUNTAINEERING.

The climbing was in charge of E. O. Wheeler. He was most ably assisted by J. D. Patterson, Dr. T. G. Longstaff, Rev. G. B. Kinney, Rev. A. M. Gordon, A. L. Wilson, A. R. Hart, and the late Dr. Kendall.

The force of guides was particularly strong. Through the courtesy of Mr. Hayter Reed and Mr. Ussher of the Canadian Pacific Railway Co., we had placed at our disposal at various times during the Camp the services of a number of their professional guides: Our old friends Godfrey Feuz, Rudolph Aemmer, Ernest Feuz, and for several days the services of Edward Feuz Jr. were loaned to us by Dr. Hickson in whose employ he was at the time. As chief guide we had with us throughout the camp Konrad Kain, our own official guide. It will thus be seen that the force was a strong one.

The spring had been a late one and much snow was found on the peaks making climbing in some cases a difficult matter. The official qualifying climbs were Mts. Bident (10,109 ft.), Fay (10,612 ft.), Temple (11,626 ft.) and Eiffel (10,091 ft.) Bident, owing to its condition, proved dangerous and too distant for one day's work, so a small camp was placed at the head of Consolation Valley, close below the Pass, and two climbs were made from it, when it was withdrawn and the mountain rejected as unsuitable. In all four parties made the ascent; two from the main camp and two from the camp at the head of the valley.

Three ascents of Mt. Fay were made but only one member graduated upon this mountain. From the Camp it was long, hard day's work, necessitating first a four mile tramp to and around Moraine Lake to the foot of Heejee glacier, then a somewhat arduous ascent of the glacier to the neve and a tramp across the same to the foot of the mountain when the ascent proper was begun, and return made by the same route. Another route was tried by way of Consolation Pass, the Boom Glacier and over what was known as the Middle Pass, on the Divide to the south of Quadra, down to the neve at the foot of the mountain. The latter was perhaps the more interesting route.

The remainder of the Graduating Climbs were made on Mt. Temple and Eiffel Peak. To accomplish these it was necessary to place an auxiliary camp in Larch Valley, a very beautiful hanging lateral valley leading from Sentinel Pass southerly between Mts. Temple and Pinnacle and Eiffel Peak, about a thousand feet above Moraine Lake. It is at the head of this valley that the Minnestimma or Sleeping Water Lakes lie, two tiny lakelets reflecting the snowy crown of Mt. Temple. A charming camp was pitched amidst the larches and all graduating members duly qualified from it.

Thirty-three members graduated as follows:

MT. BIDENT (10,109 ft.)

July 20th
Miss I. Perkins
Mr. A. S. Davies
Rev. T. G. Wallace

July 22nd
Miss E. M. Payne
Miss E. C. Smith

MT. STEPHEN (10,485 Ft.)

July 19th
I. L. Woodley

MT. FAY (10,612 ft.)

July 30th
W S. Ladd

EIFFEL PEAK (10,091 ft.)

July 27th
Miss E. Tate
Miss E. B. Tate
Miss Jean Fraser
July 28th
Mrs. L. N. MacKechnie
A. C. Galt
Allan Bone
Sidney Tims
July 30th
O. B. Stockford

MT. TEMPLE (11,626 ft.)

July 27th
Miss Allison
Miss J. T. Scott
H. W. Allan
L. S. Crosby
Wm. Innes
A. B. King
F. M. Mix
D. S. Moffat
A. W. Trickey

July 27th
Mrs. G. Battell
Miss V. E. Eyres
Miss L. Jones
Mrs. Maxwell
Mrs. McIntosh
John Bone
July 28th
Miss M. Campbell
J. H. Chapman

Climbs made of other important peaks were:

MT. QUADRA (10,350 Ft.)
(First Ascent)

Dr. F. C. Bell, Rev. A. M. Gordon, Dr. J. W. A. Hickson. Guides, Edouard Feuz, Jr. and Gottfreid Feuz.

An article in this volume by Dr. Hickson gives a detailed account of this climb.

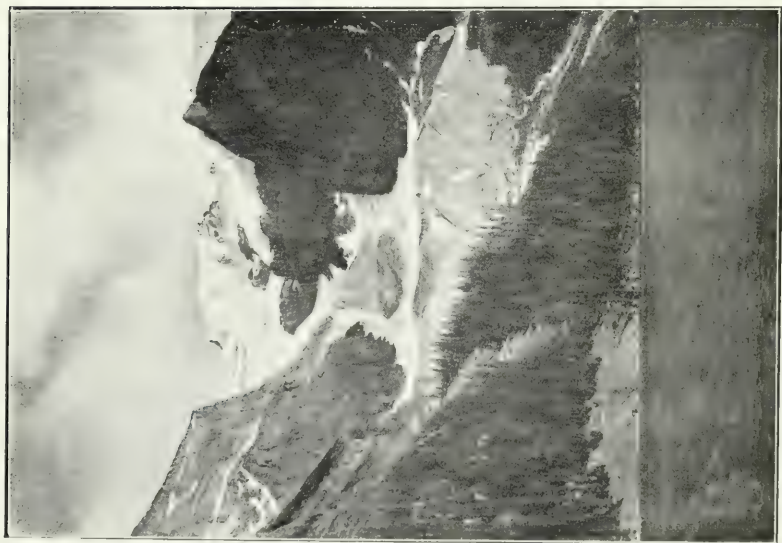


Photo Byron Harmon

MT. FAY AND HEEJEE GLACIER



Photo Byron Harmon

LUNCH IN BOW VALLEY

CHIMNEY PEAK (circ. 10,000 ft.)
(First Ascent)

Dr. T. G. Longstaff, E. O. Wheeler.

An article in this volume by E. O. Wheeler gives a detailed account of the climb.

MT. BABEL (circ. 10,000 Ft.)
(First Ascent)

A. R. Hart, L. C. Wilson, H. H. Worsfold and E. O. Wheeler.

An article in this volume by E. O. Wheeler gives a detailed account of the climb.

MT. FAY (10,612 Ft.)

July 25th. Dr. F. C. Bell, J. D. Patterson, H. H. Worsfold. Guide: Rudolph Aemmer.

July 29th. B. Harmon, K. D. McClelland, A. F. Wedgwood. Guide: Gottfried Feuz.

July 30th. W. S. Ladd, S. H. Mitchell. Guide: Konrad Kain.

Several minor climbs were made of the peaks above Boom Lake, the Tower of Babel, and the ridge directly east of Camp; also to the crest of Consolation Pass to obtain some excellent glessading which was to be had on its north slopes.

EXPEDITIONS

One two-day expedition was made by a party composed of Dr. and Miss Longstaff, J. D. Patterson, and E. O. Wheeler. It travelled to Lake O'Hara via the Wenkchemna and Opabin Passes, camping for the night at the upper end of Lake O'Hara, high up. The next day the route was continued via the Abbot Pass, Death Trap and Victoria Glacier to Lake Louise and so back to camp.

All others were one day expeditions. Several were made via Larch Valley, Sentinel Pass, Horseshoe Glacier, Wastach Pass and home by Moraine Lake; also in the reverse direction. Another expedition was over Consolation Pass to Boom Lake. This lake is beautifully situated in a deep trough between high ridges, it is very highly colored and possesses a further peculiarity, that near its east end is seen what at first sight appears to be a boom of logs reaching in a curve-convex towards the lower end of the lake—entirely across. Closer inspection shows it to be a submerged moraine which almost tops the surface of the water and has intercepted driftwood floating down the lake.

A modification of this expedition was to the Boom Glacier at the head of Boom Lake.

MINOR EXPEDITIONS.

To Taylor Pass; to Wenkchemna Glacier and Pass; to Moraine Lake; to Larch Valley and Minnestimma Lakes.

The Consolation Lakes were found to be well stocked with trout and afforded much satisfactory sport to those so inclined. The trout were small but plentiful. On several afternoons fishing parties were organized and a sufficient number caught to supply the entire camp making a most pleasant change in the fare.

BOW VALLEY AND YOHO EXPEDITION.

The Six-day Expedition following the O'Hara camp had proved such a pleasant method of terminating a delightful visit from our guests of The Alpine Club (England) that we decided to follow the precedent established and take our guests, Dr. Longstaff, Miss Longstaff and Miss Vaux on a similar expedition, varying the route by travelling up Bow River Valley to Bow Lake and rounding the same, to proceed up the valley to Bow Glaciers; then ascending the south glacier to traverse the neve between Mt. Gordon on the one side and Nicholas Peak, Beechey Head and Mt. Olive on the other to Vulture Col and, crossing it, to descend to the Balfour Glacier and follow it and the valley below to the Yoho Glacier.

The programme was carried out most successfully, and would have proved perfect, but for a bad day while crossing from Bow Lake to Yoho Valley, during most of which we were in the clouds. We left Laggan on August 2nd and arrived in Field on August 7th, accomplishing the circuit in the six days. The crossing from the Bow Valley was made possible by taking an outfit of ponies to the final camp beside Bow Lake and then carrying only actual necessities in our rucksacks, we made the crossing and were met by another outfit of ponies close to the Yoho Glacier on the west side, where we had camped with the party from O'Hara the year before. There we were able to get dry clothes and other requirements.

The day following we pushed on to the Club's camp in the Upper Yoho Valley where we found everything in readiness for our arrival and a number of members who had been at the Consolation Valley Camp, waiting to bid us welcome, and our smiling chef, Jim Pong, more than ready with his part of the programme—a most important part. Next day we reached Mt. Stephen House at Field, Longstaff, Bell, Worsfold, Harmon and E. O. Wheeler crossing the Emerald Pass; and the others returning by the upper trail and Burgess Pass. Longstaff insisted in making the traverse, notwithstanding his broken finger being in poor shape. The expedition was concluded happily, the only jarring note being the wet day when we particularly wanted it to be fine. For an account of the expedition see article by B. S. Darling in this volume.

ART COMPETITION.

The Judging Committee were: Mrs. J. W. Henshaw, Mrs. P. Burns and J. Howard Chapman.

In Class 1—Photographs of Alpine scenes 4 x 5 or smaller—the first prize was awarded to Charles H. Mitchell.

In Class 2—Photographs of Alpine scenes larger than 4 x 5—the first prize was awarded to James F. Porter.

Camp closed on July 30th though a few members were detained until the following day.

ATTENDANCE

The attendance was much smaller than at the crowded O'Hara camp. One hundred and nineteen were placed under canvas. A synopsis of the attendance by Provinces, States and Countries is sub-joined.



Photo Byron Harmon

BOW GLACIER AND LAKE

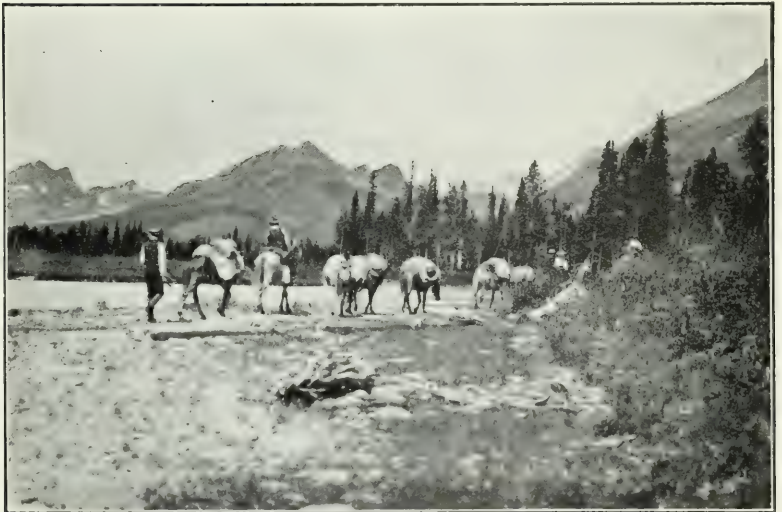


Photo Byron Harmon

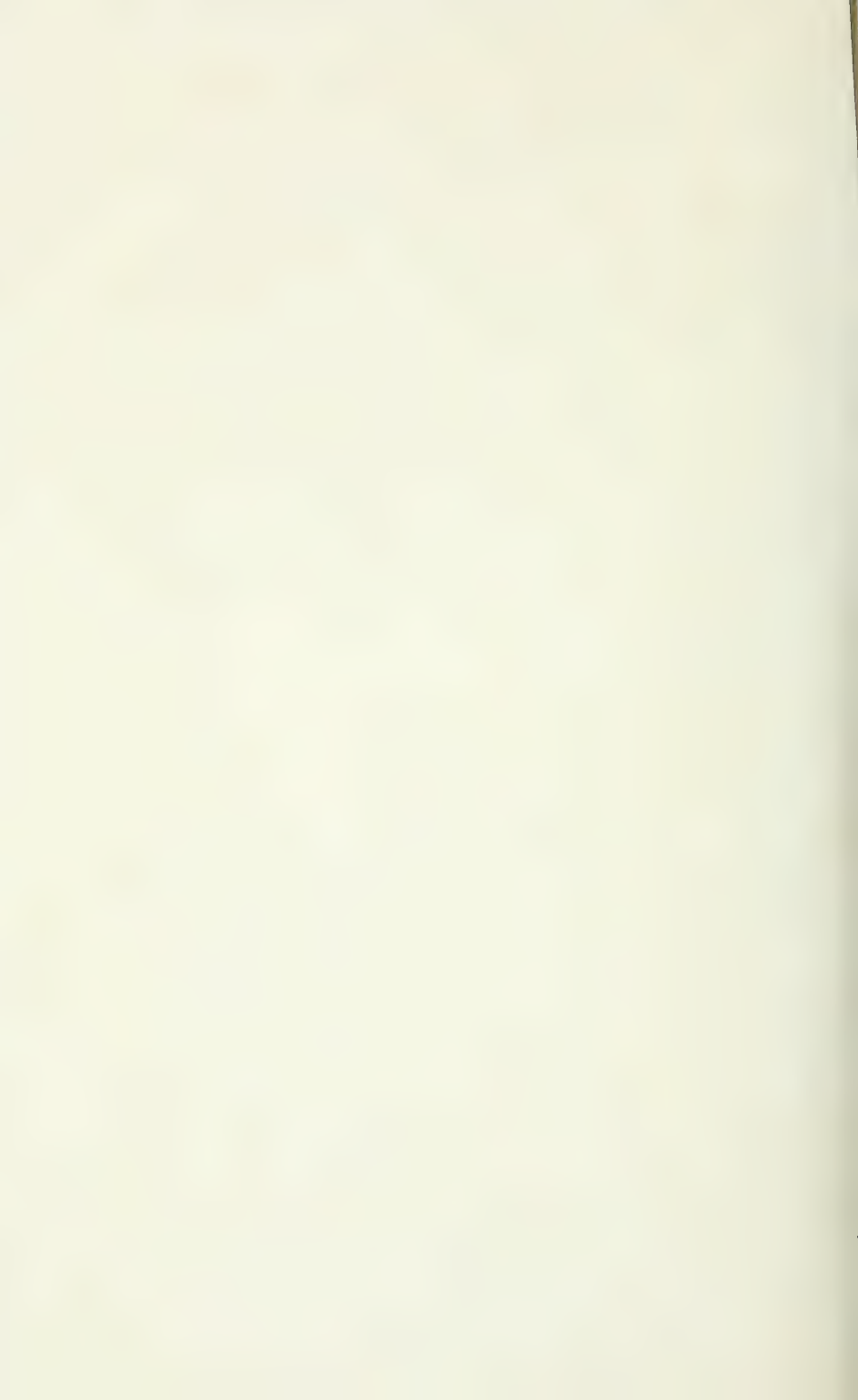
TRAVELLING UP BOW VALLEY



ON EMBELATIN GLACIER
Photo Byron Harmon



ON BOW GLACIER
Photo Byron Harmon



IN CANADA.

BRITISH COLUMBIA—Chilliwack, Cranbrook, Field, Golden, Keremeos, Vancouver, Victoria. ALBERTA—Banff, Brant, Calgary, Carbon, Cowley, Coleman, Crossfield, Leduc, Lethbridge, Okotoks, Pincher Creek, Red Deer. SASKATCHEWAN—Moose Jaw, Regina, Saskatoon. MANITOBA—Lillyfield, Winnipeg. ONTARIO — Peterborough, Pinkerton, Port Hope, Toronto, Walkerton, Woodstock. QUEBEC—Montreal, South Durham.

FROM THE UNITED STATES OF AMERICA.

ILLINOIS—Chicago, Galesburg, MASSACHUSETTS—Boston, West Newton. MICHIGAN—Saginaw. MINNESOTA—Minneapolis, St. Paul. MISSOURI—St. Louis. NEW HAMPSHIRE—Antrim. NEW YORK—Brooklyn, New York. OREGON—Portland. PENNSYLVANIA—Bryn Mawr, Philadelphia. DISTRICT OF COLUMBIA—Washington.

FROM OVER SEAS.

ENGLAND—Buckhurst Hill, Croydon, London, Stoke-on-Trent, Wimbledon. AUSTRIA—Vienna. ITALY—Florence. SICILY — Rizzolo. SWITZERLAND—Interlaken.

YOHO CAMP.

For the summer of 1910, as an experiment a Club Camp was placed in the Yoho Valley and maintained there from July 7th till August 23rd. It was found to be a very expensive luxury and was not patronised sufficiently to warrant a repetition. The camp was very attractive and much enjoyed by those who stayed there; some staying there as long as two weeks and one a full month. It was situated at the upper end of the Little Yoho Valley, near the fine fall. The location was a perfect one. Two bell tents and a cook tent and awning for a table for meals were placed in a shady grove of spruce beside the glacial Yoho torrent. All around were snow-clad peaks and directly opposite Mt. President. Much excellent climbing could be done from here and for a considerable part of the time Konrad Kain was at the camp, available for those who wished to take advantage of his professional skill. Mr. C. A. Richardson was in charge and managed the camp very nicely. Transport to and from it had been arranged with Otto Bros., the Club's official outfitters, but at the commencement of the season they sold out to the Brewster Transfer Co. to whom the Ottos passed over their agreement. The result was a most indifferent service. It is much to be regretted that here the mountain transport is handled by a monopoly, which can only result in poor service. The individuality of the old-time outfitters has gone and a lot of cheap hirelings have been substituted.

ARTHUR O. WHEELER,

Director.

THE CLUB HOUSE.

The season of 1910 began with the opening of the Club House and Camp at Banff on the 15th June. A new feature of the arrangements was the provision of bedding for those who desired to go into residence. This year it is intended to increase this accommodation to fifteen beds

or more. The Club guide Konrad Kain was at the Club House until July when he was called away to camp work. Among the principal improvements to the fabric were the addition of eaves troughs and a proper run off and a porch to the kitchen entrance. Both these were greatly needed. Four new tent houses were built, one being a guide house. The Club House was open for visitors till the end of September. The number of persons registered outside the staff was the same as the year before, but the distribution was wider and the number of invited guests smaller. The month of August was most inclement at Banff and this had probably a great deal to do with the smaller attendance from the neighboring towns.

Among the more distinguished guests of the Club at Banff were Prof. Norman Collie and Mr. A. L. Mumm, with his guide, M. Inderbinnen. They stayed at the Club House to mature their plans for their trip in the Mt. Robson region which is alluded to in "Alpine Notes." There also from far away Sicily came Mr. Eaton and Lieut. Marocco with their guide, H. Burgener. They too went on their way to the Freshfield group, Mr. Eaton's account of his expedition appearing in the Mountaineering section of this volume.

With us at different times were Dr. and Miss Longstaff who were never tired of extatiating on the beautiful situation and comfort of the Club House. Almost every afternoon a considerable portion of the writer's time is occupied in giving information to strangers about the mountain region, showing the Club House and answering questions, wise and otherwise.

Among the gifts to the furnishing were a large Grandfather's Clock given by his family in memory of the late Hector Wheeler; four of Mr. W. D. Wilcox's beautiful photographs of scenes in the Canadian Rockies, framed, given by himself, and the tablet with the inscription in memory of the late William Vaux of Philadelphia was placed in the niche prepared for it in the fireplace. Thus completing that generous gift. Mr. Geo. Vaux, Sr. was good enough to bring the tablet himself. Mr. J. P. Forde presented a most suitable and effective fender. Mrs. Henshaw gave framed photographs of flowers which in their present position attract admiration from all who enter the building.

S. H. MITCHELL,
Secretary Treasurer.

SPILLIMACHEEN EXPEDITION.

After all camp matters had been closed up, a final expedition was conducted to the Spillimacheen mountains. In this expedition Dr. T. G. Longstaff collaborated, paying half the expenses and thereby making it possible to the Alpine Club. It was designed to enter the mountains by one of the branches of the Spillimacheen River and cross the same to the Duncan Beaver Divide, and thence, by way of the Beaver River and Bear Creek to Glacier. While making this crossing it was intended to map the adjacent country by photo-topographic methods. How we fared will be seen by reading the account of the expedition written by Dr. Longstaff for the Geographical Journal and from which it is copied in our mountaineering section in the current Journal.

STATEMENT OF TREASURER

May 31st, 1910, to May, 31st, 1911.

Receipts.

Balance on hand June 1, 1910	\$ 234.99
Fees	2,225.73
Club House Accommodation	663.65
Camps	1,898.70
Journals	216.97
Ribbon	3.00
Ice Axes	60.85
Interest	19.96
Alberta Government for 1910 Camp	500.00
Alberta Government for 1911 Camp	500.00
B. C. Government for 1910 Camp	1,000.00
B. C. Government for 1911 Camp	500.00
A. O. Wheeler, loan	500.00
Club House Fund	96.15
Draft returned (wages)	98.96
Contributions	300.00
Total	\$8,818.96

Disbursements

Wages	\$1,485.33
Club House Equipment	179.09
Club House Supplies	492.81
Camp Account	4,036.56
Printing	304.20
Taxes	27.00
Insurance	180.00
Postage and Sundries	169.90
To Close Building Fund	7.57
Banff Livery	147.50
Journal	819.85
Ice Axes	75.00
Interest	22.55
Balance in Bank May 31, 1911	871.60
Total	\$8,818.96

CAMPS ACCOUNT

1910

Receipts.

Alberta Government	\$ 500.00
B. C. Government	1,000.00
Board and Accommodation	1,240.55
Baggage	263.50
Sundries Sold	271.75
Sale of Tent	23.25
Help Fund	172.80
Deficit balance	534.38
Total	\$4,006.23

Disbursements

Supplies	\$1,150.50
Pack Ponies	1,621.55
Outfit	375.36
Wages	587.90
Goods for sale	98.12
Help Fund	172.80
Total	\$4,006.23

**SUMMARY OF EXPENSES OF SPILLIMACHEEN SURVEY
EXPEDITION, 1910**

Paid by Alpine Club:—

Wages	\$188.00
Transport and pony service	185.50
Provisions	35.30
Incidentals	39.10
Photo Plates for Survey	15.34

Paid by Dr. Longstaff:—

Wages	112.50
Transport and Pony service	186.70
Provisions	35.30

\$797.74

BUILDING FUND

C. B. Sissons	\$ 20.00
Miss E. R. Smith	20.00
F. Lambert	20.00
H. H. Lyman	50.00
Miss A. G. Foote	10.00
L. S. Amery	20.00
Miss Oldhan	7.15
Miss Finlayson	50.00
A. M. Bartleet	15.00
G. Kinney	10.00
W. J. S. Walker	10.00
R. M. Thomson	50.00
Mrs. L. McKechnie	10.00
P. M. Campbell	30.25
B. F. Seaver	250.00
J. D. Patterson	50.00
S. L. Jones	50.00
H. W. Rolfe	10.00
Mrs. Parker	10.00
H. H. Worsfold	25.15

Total \$ 717.55

SUMMARY**Receipts**

June 1, 1910, balance	44.13
Subscriptions	717.55
General Account	7.57

Total \$ 769.25

Canadian Bank of Commerce for note	673.10
General Fund to close	96.15

Total 769.25

CANADIAN PACIFIC

The Route Through the Canadian Rockies

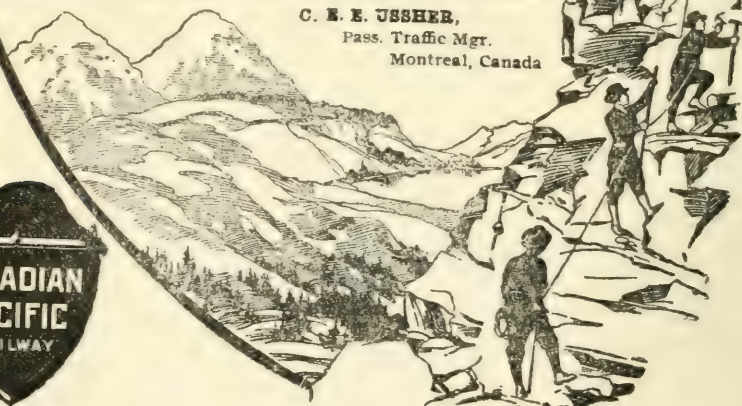
The climbers find in the Canadian Rockies the supreme difficulties and delights that tempt men to the mastery of mountains. Snow-capped peaks, moraines, glaciers; all the charm and hazard of the Swiss mountains are here, but multiplied. The Canadian Rockies have been well termed

Fifty Switzerlands in One

This famous Alpine region is reached only by the Canadian Pacific Railway. Swiss guides are to be found at all the mountain hotels.

Send 4 cents postage for booklet, "The Challenge of the Mountains."

C. E. E. USSHER,
Pass. Traffic Mgr.
Montreal, Canada

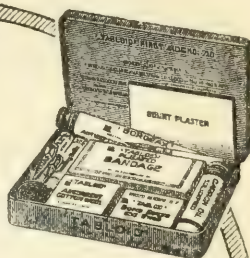


REQUISITES FOR MOUNTAINEERS



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Size: $6\frac{1}{2} \times 3\frac{1}{4} \times 2$ in.
Contains Bandages,
Dressings, Antiseptics,
Restoratives, etc.
In Enamelled Metal



No. 710
'TABLOID'
FIRST-AID

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Size: $4 \times 3\frac{1}{16} \times \frac{5}{8}$ in.
Contains Bandages,
Dressings, Anti-
septics, Plasters, etc.
In Scarlet Enamelled
Metal

TRADE MARK

'TABLOID'

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FIRST-AID

Complete

Compact

Portable

Climate-proof

Outfits to meet all requirements are issued

*Particulars and prices obtainable of
all Pharmacists, or from B. W. & Co.*

“HAZELINE”
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SNOW”

A delightful, non-greasy pre-
paration for keeping the skin
soft, velvety and comfortable.
Cools, soothes
and relieves in-
flammation and
excessive pers-
piration.

Sold in glass pots



Greatly Reduced

‘HAZELINE’
(TRADE MARK)
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An ideal emollient. Most
beneficial and grateful when the
skin is painfully scorched
by the sun or cracked by
frosty winds.

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Grand Trunk Pacific Railway

MOUNT ROBSON.

As the pathfinders who are locating the line of the Grand Trunk Pacific Railway in the West penetrated the Rocky Mountain range, their reports have become most interesting. The Yellowhead Pass and environs being especially interesting from a scenic standpoint. Issuing from Moose Lake the Fraser River moves slowly in a wide stream for two or three miles, then it narrows and, taking a steeper grade, hurries rapidly down them. A few miles below the lake the Grand Trunk Pacific crosses from the north to the south side of the river, and the valley becomes more confined as the mountain closes in upon the river. Beyond this the valley opens up to a wide basin-like flat. In this flat and fourteen miles below the lake the first of two large northern tributaries, a mile and a half apart, joins the Fraser.

This stream, known as the Grand Fork, is one hundred feet wide and one of the most imposing views met with in the lake route is looking up this tributary. Great mountains are on every hand, but above all stands Robson Peak, a giant amongst giants and immeasurably supreme. The following description is taken from a report of the Geographical Survey of Canada issued in 1909:—

"When we first caught sight of it, a shroud of mist partially enveloped the summit but this presently rolled away, and we saw its upper portion dimmed by a necklace of feathery clouds, beyond which its pointed apex of ice, glittering in the morning sun, shot up far into the blue heaven above. The top of the mountain is usually completely hidden and rarely, indeed, is it seen entirely free from clouds. The actual height of the peak is 13,700 feet."

Although Robson Peak has been long known, its height had never been determined until recently, nor was it supposed to be particularly notable in that respect, but now, since the height of other mountains in the Rockies which were considered to be the highest in Canada have been proved to be greatly exaggerated, Mount Robson has the distinction of being the highest known peak in the Canadian Rocky Mountains, and will be, owing to its magnificent surroundings, one of the greatest attractions of the Grand Trunk Pacific for tourists and alpine climbers, and as one mountain climber who has made two attempts to ascend this mountain, has said, "It will be the show place of the world." The mountain is easy of access, within a few miles of the Grand Trunk Pacific Track.

W. E. DAVIS,	G. T. BELL,	W. P. HINTON,
Pass. Traf. Mngr. Asst.	Pass. Traf. Mngr.	Gen. Pass. Agt.
Montreal.	Montreal.	Winnipeg.

